Great Lakes Reconnaissance Survey

Water and Sediment Quality Monitoring Survey
Harbours and Embayments
Lake Superior and the Spanish River

Lisa A. Richman
Water Monitoring Section
Environmental Monitoring and Reporting Branch
Ontario Ministry of the Environment

January 6, 2004

FOREWORD

The Environmental Monitoring and Reporting Branch monitors ambient water quality in the nearshore of the Great Lakes on a cyclical basis. In 1999 the focus of monitoring activities was on the Lake Superior nearshore. Environmental information was collected in the areas of Thunder Bay and Marathon Bay (Peninsula Harbour), Jackfish Bay, Nipigon Bay, the Pic River and the Spanish River, as part of the Great Lakes Nearshore Monitoring and Assessment Program. Although these data were not collected specifically for the Remedial Action Plan (RAP) program, this information can be used by the Lake Superior RAP teams as supplemental data to assess water and sediment quality improvements that may be related to remedial actions and determine if these Areas of Concern can be delisted.

ACKNOWLEDGEMENTS

The Lake Superior Harbour Water Quality Monitoring Survey was conducted by the Water Monitoring Section of the Environmental Monitoring and Reporting Branch of the Ontario Ministry of Environment (MOE).

The author would like to acknowledge the assistance of Duncan Boyd and Todd Howell of MOE for their review of the report and assistance with the survey design and Sandra Luz for her editorial review and comments.

The author would also like to acknowledge the efforts of the crew chief Wendy Page for the field work and further acknowledge the efforts of the Biomaterials and Sediment Unit, Water Chemistry Unit and Dioxin and Furan Unit of the MOE Laboratory Services Branch for the analysis of these samples.

Special thanks to Gary Stronghill for assistance with the figures in this report.

EXECUTIVE SUMMARY

Surface water samples were collected in the spring, summer and fall of 1999 and sediment was collected during the summer survey in the areas of Thunder Bay and Marathon Bay (Peninsula Harbour), Jackfish Bay, Nipigon Bay, the Pic River and the Spanish River, as part of the Great Lakes Nearshore Monitoring and Assessment Program.

Nipigon Bay

With few exceptions, water and sediment samples collected from Nipigon Bay did not suggest significant environmental impairments. There was some sediment contamination (i.e. dioxin-like PCBs (polychlorinated biphenyls), Hg, PAHs, PCBs, TOC), in the vicinity of the local pulp and paper mill and water pollution control plant (WPCP) but concentrations were not high enough to suspect impacts on the benthic community.

Concentrations of nutrients (with the exception of total phosphorus -TP), and bacteria in water were low. Total phosphorus concentrations were typically between 4 and 8 *u*g/L at all stations sampled in the spring and summer survey with the exception of stations located 30 and 500 m respectively downstream of outfalls for the pulp and paper mill and Red Rock WPCP. Concentrations of TP ranged from 24 to 40 *u*g/L in the spring at these two stations. Temperature and conductivity (measured by the Hydrolab), suggested the presence of a surface plume as well. Chloride concentrations were low at all stations (<3 mg/L). Organic compounds in general and compounds associated with the pulp and paper industry in particular, were routinely below the method detection limit.

Water quality appears to have improved since the 1983 survey, which documented impairments to water and sediment due to effluent from the pulp and paper facility.

Jackfish Bay

As with the data from Nipigon Bay, there were slightly elevated concentrations of some contaminants but sediment samples did not suggest significant environmental impairments. All the sediment data were extremely consistent with historical data, suggesting little change in sediment quality over time.

Impacts from the mill effluent on water quality throughout Moberly Bay and the northern and western portions of Jackfish Bay that were obvious in the 1981 and 1987/89 surveys (i.e. nutrients, metals and phenols greater than the Provincial Water Quality Objectives (PWQO), high suspended solids), were not evident in the 1999 survey. The installation of secondary treatment at the mill has likely contributed to the improvement in water quality throughout the bay. Although it should be noted that this survey only represents one day of sampling per season and the movement of the effluent plume is highly dependent on wind and current direction. However, notwithstanding the apparent improvement in water quality in Moberly Bay and Jackfish Bay, chloride concentrations and conductivity were clearly elevated at the mouth of Blackbird Creek (similar to historical data), as were concentrations of total inorganic nitrogen (TIN), total organic nitrogen (TON) and TP and suspended solids particularly in the spring and summer surveys. TP in the spring was 144 *u*g/L at the mouth of the creek compared with concentrations in Moberly Bay and Jackfish Bay that were 16 and 4 *u*g/L respectively. Also of note, were extremely high TP (440 *u*g/L) and ammonia/ammonium (1.16 mg/L) concentrations at this station in the summer. Dissolved oxygen was also lower at this station (5.5 mg/L) compared with all stations located further downstream (9 mg/L) and conductivity, measured using the Hydrolab, was as high as1,351 *u*S/cm. In general, water quality at the mouth of

Blackbird Creek was consistent with data collected in 1987/88 and does not appear to have improved substantially.

Pic River

Sediment quality in the Pic River and embayment were not enriched with metals or nutrients and all concentrations were less than the lowest effect level (LEL) with the exception of total kjeldahl nitrogen (TKN).

Water collected in the spring from the plume extending from the Pic was extremely turbid with suspended solid concentrations at 3,520 mg/L. *E. coli* and fecal streptococci counts were 280 and 720 counts/100mL, respectively. This was in contrast to data collected in the summer and fall. As well, nutrient concentrations were high compared with the other stations sampled in the area. TON concentrations were 2,398 *u*g/L at a station located in the plume compared with concentrations that were less than 158 *u*g/L at the remaining stations. TP was also high at 1220 *u*g/L compared with concentrations that were between 4 and 12 *u*g/L.

Although the surveys were representative of one day per season, the spring data in particular suggested that the Pic River has impaired water quality and could be a significant source of nutrients and bacteria.

Spanish River

Sediment samples collected from stations located downstream of the mouth of the Spanish River were contaminated with Cu, Fe, Mn and Ni. Concentrations of these metals in sediment at several stations were greater than the severe effect level (SEL). The highest concentrations were at two stations in the Whalesback Channel (station 401 and 209), but the impact from contaminant sources upstream in the Spanish River was evident throughout the area extending into Aird Bay and the McBean Channel. Sediment collected from one station was also contaminated with dioxins and furans. This pattern of sediment contamination was consistent with sediment surveys in the 1980's and 1990s and was attributed to the local mining and smelting industry which has been operating in the area since the 1930's (Spanish Harbour RAP Team 1993).

All metal concentrations in water were below the PWQO with the exception of Ni (PWQO: 25 *u*g/L), at the mouth of the Spanish River in the spring (27.6 *u*g/L +/- 1.7 *u*g/L). Ni concentrations were consistently high at all stations in the survey area (21 *u*g/L) during the spring. In the summer and fall concentrations were lower but the highest concentration was always present at the station at the mouth of the river.

Nutrient concentrations (nitrogen and phosphorus) and suspended solids were consistent among the sampling stations and generally were low.

Thunder Bay

Results in 1999 were similar to previous studies in that the most degraded area was identified as the lower Kam River with a zone of impact that radiates out from its delta.

Previous surveys in 1983 and 1985/86 have identified the Kam River as a source of nutrients, metals and conventional parameters such as Cl and biological oxygen demand (BOD) (Ontario Ministry of Environment et. al. 1991). The 1999 water quality data for TP, TIN and Cl followed a similar pattern. TP was greater than the PWQO in samples associated with the Kam River

(range 48 to 72 ug/L). The source of inorganic nitrogen to Lake Superior is likely atmospheric, however, consistently for all three surveys, the highest concentration of inorganic nitrogen was detected at the mouth of the Kam River downstream of the sweage treatment plant (STP) suggesting the STP as a source of nitrate and ammonia/ammonium. The 1999 data for metals were also consistent with earlier studies whereby concentrations of metals in general were higher in the Kam River than at other stations sampled.

In contrast to earlier surveys where trichlorophenols, pentachlorophenol, resin acids and fatty acids and other products of the pulp and paper industry were detected in water collected from the Kam and Mission Rivers, in 1999 only reactive phenols were detected at trace concentrations.

Sediment TOC and loss on ignition (LOI) were extremely high outside the Provincial Papers filtration bed (station 465 - range:180 mg/g to 380 mg/g and 360 to 710 mg/g, respectively). The field crew described the samples as "100% pulp from the mill discharge". The samples consisted of a grey and white fibrous paper material consistent with previous sampling surveys in the area (Ontario Ministry of Environment et al. 1991). The data suggested that the filtration bed was not adequately retaining the pulp discharged to the area. Mercury also exceeded the SEL in one replicate sample collected from this station (5.5 ug/g), but the remaining two replicates had lower concentrations (0.49 and 0.97 ug/g). The sediment within the filtration bed has a history of Hg contamination suggesting that the outlier is likely a real value and the areal extent of contamination highly variable. This site also had the highest concentrations of total Hg in water when compared with other sites in the survey (14 ng/L). As well, this station had the highest sediment concentrations of Pb, TKN, Cr, Cu and Zn.

Peninsula Harbour

The historical discharge of Hg into Jellicoe Cove (from improperly treated wastewater, spills, leaks and vapour loss from the Fort James Marathon kraft pulp mill (formerly James River-Marathon Ltd.)) (Peninsula Harbour RAP Team 1991), was evident in the 1999 survey. Mercury concentrations in sediment detected at the two stations in Jellicoe Cove were similar to concentrations reported in a 1991 survey (Smith, 1992). Consistent with previous sediment surveys (Jardine and Simpson, 1990), PCB contamination was also detected in sediment from Jellicoe Cove and Beatty Cove, although concentrations were lower than in 1984. The PCB contamination is thought to have originated from the pulp and paper mill or the chlor-alkali plant (Smith, 1992). This was also likely the source of the polycyclic aromatic hydrocarbons (PAHs) and chlorinated benzenes detected in the sediment in 1999 at the same station in Jellicoe Cove.

Although there were significant water quality improvements in the vicinity of the mill's outfall since the 1970s due to improvements to the mill and the relocation of the outfall in 1983, PWQOs for some metals and organic compounds were exceeded in 1984/85. In contrast, in 1999 the PWQO was not exceeded for any parameters in samples collected upstream and downstream of the new outfall and concentrations of all parameters were similar (nutrients and metals) at the two stations. Parameters typically associated with the mill effluent such as resins and fatty acids, total reactive phenolics and chlorinated phenols were not detected in any water samples. As well, these parameters were not detected in Jellicoe Cove where the mill historically discharged its effluent. Chloride concentrations downstream of the mill were lower in 1999 than in 1984/85 (measured near the previous mill outfall) as were TP concentrations.

Bacterial contamination in the study area was low (or below the detection limit) as were concentrations of TP, ammonia, TKN and nitrate.

TABLE OF CONTENTS

LIST OF FIGURES

All figures are appended at the end of the report.

LIST OF TABLES

All tables are appended at the end of the report.

APPENDICES

Appendix 1: Selected water quality parameters collected for the Great Lakes Nearshore Index Station Network, 1999

Appendix 2: Water quality data for field and travel blanks collected for the Lake Superior Harbour Water Quality Monitoring Survey, 1999

GREAT LAKES RECONNAISSANCE SURVEYS - Harbour and Embayment Water and Sediment Quality Monitoring - Lake Superior and the Spanish River

BACKGROUND

The Environmental Monitoring and Reporting Branch monitors ambient water quality in the nearshore of the Great Lakes on a cyclical basis. In 1999 the focus of monitoring activities was on Lake Superior. Environmental information was collected in the areas of Thunder Bay and Marathon Bay (Peninsula Harbour), Jackfish Bay, Nipigon Bay, the Pic River and the Spanish River, as part of three sub-programs of the Great Lakes Nearshore Monitoring and Assessment Program (GLWQM).

The data collections were part of the **Great Lakes Reconnaissance Surveys** (GLRS), a two part activity with the purpose of characterizing water quality conditions in the immediate nearshore, the zone most strongly and directly affected by land based activities. The two components of the work are:

(A) *Nearshore Mapping*

A survey design suited to mapping spatial patterns is used to evaluate nutrient, bacteriological, physical and aesthetic features of water quality along selected ranges of shoreline throughout the Great Lakes, and

(B) *Harbour Water Quality Monitoring*

More extensive sampling at a limited number of key sites where water quality conditions are known to be impacted, or, have a potential for impact is used to assess the range of conditions in an area.

The objectives of the 1999 GLRS surveys were to:

(a) Determine general nearshore water quality conditions at harbours, embayments, and tributary mouths over a range of potentially degraded and background areas within the Lake Superior drainage basin,

(b) Compare water and sediment quality among these areas, and

(c) Flag locations and water/sediment quality parameters that exceed Provincial Water Quality Objectives and Provincial Sediment Quality Guidelines (PWQOs/PSQGs)

The third element of the GLWQM in which environmental information was collected in 1999 was the **Great Lakes Nearshore Index Station Network**. Data on water and sediment quality and the benthos were collected at various reference and index stations. The purpose of this activity was to provide information on how ambient water quality conditions were changing over time by periodically monitoring a suite of indicators at a small network of stations. A subset of the water quality data collected for the Index Stations are provided in Appendix 1.

Below is a summary of methods and results for the *Harbour Water Quality Monitoring* component of the GLRS surveys.

METHODS

Station Locations

Water and sediment were collected from five or six stations in each of the harbours or embayments. The 1999 data for each of the areas were compared with local Index stations also sampled in 1999. These stations were established in 1992 for the Great Lakes Nearshore Index Station Network. Figures 1 to 6 provide a map of the sampling stations from each survey area. All figures are provided at the end of the report.

Field Methods

Water

Water samples were collected during three surveys (April, August, October) to assess seasonal variation.

Secchi depth, water temperature, field conductivity, field pH and field dissolved oxygen were measured at all stations using a Hydrolab. At stations less than 3 m in depth, parameters were measured at 0.5 m increments. If the depth was 3 m or greater, the station was profiled at 1 m increments. The profile data was not provided in this summary but is available on request.

Whole water (unfiltered) grab samples were collected at 1.5 m below surface at all sampling stations during each survey period (with the exception of the Index station where depth-integrated water samples were collected). If information from the profiling suggested that a plume existed shallower than 1.5 m, the water sample was collected from within the plume. At shallow stations (less than 3 m) the samples were collected at mid depth unless a shallow plume had been identified. Water samples were collected using a March Model 5C MD submersible pump with Teflon® fittings. The tubing was cleaned with acetone every day. The sampling line was rinsed with sample water at each station prior to sample collection for 5 minutes. Water samples collected for bacterial analysis were collected directly into a sample bottle held at 1 m below the surface using a sampling pole. Metal samples were acidified according to the Laboratory Service Branch methods manual, and mercury samples were collected and acidified as per instructions provided below. Standard sample containers (PET, 8C) were used unless otherwise indicated (e.g. low level Hg analysis). Except for those bottles that contained preservatives or had been pre-cleaned or required special instructions (e.g. Hg), all sample containers were rinsed twice with sample water before filling the container.

Depth-integrated water samples were collected from the Index stations by lowering, at a steady rate, a collection device consisting of two, 1 litre glass bottles fitted in a lowering frame.

Laboratory analysis of water samples included the following parameters: chloride, ammonia/ammonium, nitrate/nitrite, total kjeldahl nitrogen (TKN), total phosphorus (TP), suspended solids, arsenic, mercury (Dorset low level analysis), metals (Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Sr, Ti, Wu, Zn) and bacteria, as well as, resin and fatty acids, chlorinated phenols, total phenols and acid, base, neutrals. Conductivity was analysed at selected stations to serve as a comparison with field measurements. Water collected from the Index stations was submitted for a subset of the above listed parameters.

Low Level Mercury Analysis

Single samples were collected from each station in the spring, summer and fall. The spring samples were collected using the March Model 5C MD submersible pump with Teflon® fittings as described above. The "field blanks" from the spring data (obtained by pouring distilled water through the collection system for 5 minutes and then collecting a sample which was submitted for all analytical requests), indicated that the Hg samples were being contaminated, in part, from the sampling line (Appendix 2). The contamination of the field blanks was also due to the double distilled water passed through the sample line. This was concluded based on the data from the spring "travel blanks" (obtained by filling the sample bottles with double distilled water from the Rexdale laboratory and transporting them to the field and back.). Accordingly, the spring data should be interpreted with caution although the results are consistent with the data collected in the summer and fall.

Our spring "handling blank" indicated that contamination due to sample handling was minimal (0.9 ng/L). Handling blanks consisted of a sample bottle filled with distilled water from the Dorset lab (where the samples were analysed for Hg), opened in the field for about 10 seconds or the length of routine sampling time and acidified as per a normal sample. The acid used to acidify the samples was also analysed for Hg and the result showed minimal contamination as well (0.67 ng/L).

Based on the results from the spring, our sample collection procedure was modified for the summer and fall surveys. Water samples were collected directly into the sample bottle using a pole from a depth of 1.5m. The "handling blanks" for the summer and fall collection provided an indication of contamination from sample processing. The "travel blanks" for the remainder of the survey confirm the contamination of the Rexdale laboratory double distilled water. This water did not come in contact with the samples.

Good quality, powder free latex or vinyl gloves were worn during the sample collection and preparations. Gloves were changed frequently throughout the day. Water samples for low level mercury analysis were collected in preconditioned, pyrex, 250mL sample bottles. The bottles were not un-bagged until sampling, rinsed at least 3 times with sample water (using the pole), re-bagged immediately after acidification (or prior to acidification if the samples were to be acidified at the end of the day), and kept in a cooler or refrigerator in the dark. Bagged samples were placed in a second larger bag. Labels were on the outside of the bags to avoid label contamination. Sample bags were closed tightly and the second larger bag was carefully placed in the cooler to avoid melting ice from entering the bags.

For acidification, 1 mL of clean, good quality concentrated HCl was added to each sample, using a clean pipette tip, discarding tip if it became contaminated with sample water from splashing.

Sediment

Sediment was collected in August. At each station three replicate grab samples (top 3 cm) were collected using a Shipek grab sampler. If samples were observed in the field to be high in percent sand, only a single or duplicate sample was collected. Sediment was submitted for analysis for the following parameters: particle size groups, loss on ignition (LOI), total organic carbon (TOC), total phosphorus, total kjeldahl nitrogen, arsenic, mercury, ICP metals, total PCBs (polychlorinated biphenyls), organochlorine pesticides and chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons and dioxins/furans (one sample per area only). Sediment collected from the Index stations were submitted for a subset of the above listed parameters.

The top 3 cm was removed from the sampler, homogenized, and distributed into the appropriate containers using stainless steel and Pyrex implements rinsed with distilled water and hexane between samples.

Quality Assurance/Quality Control

Water

One field blank and 1 split sample was submitted for all water quality parameters per sampling period per sampling area. The field blank provided information on field and sample container effects. The split sample provided information on sample handling and analytical reproducibility. The field blank was obtained by pouring distilled water through the collection system for 5 minutes and then collecting a sample, which was submitted for all analytical requests (except bacteria).

Distilled water travel blanks were obtained by filling the required bottles for all analytical requests (except bacteria) and transporting them to the field and back. All blank data are provided in Appendix 2. Data provided in this report were not "blank corrected".

Sediment

For sediment, 1 split sample was submitted for all sediment quality parameters per sampling area. This split sample provided information on sample handling/preservation and transport effects in combination with analytical reproducibility.

Analytical Methods

All water and sediment samples were analysed at the MOE Rexdale laboratory with the exception of the low-level Hg analysis that was provided by the MOE Dorset Laboratory. All laboratory analytical procedures for contaminants in water and sediment followed the methodology outlined in the Handbook of Analytical Methods for Environmental Samples (MOE 1983).

For water analysis, procedural updates are provided in MOEE (1995d, 1995f to 1995i and 1997a to 1997c.). For sediment analysis, procedural updates for metals, nutrients, particle size, LOI and TOC are provided in MOE 1989a & b and MOEE 1995a, b & e, 1997d. Procedural updates for total PCBs, (MOEE 1996), organochlorine pesticides and chlorinated benzenes, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons and dioxins/furans are provided in MOEE (1994a & b and 1995c).

Data Interpretation and Analysis

Since water samples were collected at a single point in time within a season (spring, summer and fall), the data are an indication of the water quality at the time of sampling only. Lake Superior has a large influence on the nearshore and tributaries, hence changes in the concentration of various parameters in the nearshore area can be significant over a short time due to variations in Lake Superior currents, tributary flow rates and local weather patterns (e.g. precipitation events).

Concentrations of contaminants in water and sediment samples were compared with the Provincial Water Quality Objectives (PWQO) (MOEE 1994) and the Ontario Sediment Quality Guidelines (PSQG) (Persaud et al. 1992). As well, sediment contaminant data were compared

with mean background contaminant concentrations for the Great Lakes basin (pre-colonial horizon) (Persaud et al. 1992) and for Lake Superior depositional zones (Mudroch et al. 1988).

For bacteria, the Ontario Ministry of Health and Long Term Care has established a guideline for recreational water quality which is 100 *E. coli* per 100 mL sample based on the geometric mean of the level of *E. coli* averaged over a minimum of five samples collected within one month (MOEE 1994). The data from the Harbour Water Quality Surveys were compared with this guideline. However, note that conclusions are based on three rather than five sampling events over seven months and since samples were not collected according to MOE Beach Monitoring Protocol these data can not be used to infer the presence or absence of a health risk.

TIN is defined as total inorganic nitrogen (nitrate plus nitrite plus ammonia/ammonium) and TON is total organic nitrogen (total kjeldahl minus ammonia/ammonium).

Trace elements tend to accumulate and bind to the clay/silt sediment fraction represented by particle sizes of less than 63 μm (Forstner and Wittmann 1983; Krumgalz et al. 1992). Accordingly, it is necessary to adjust trace element concentrations for the different particle size distributions at the various sampling stations in order to compare contaminant concentrations between stations if the effect of depositional environments are to be diminished and trace metal contaminant sources are to be inferred. The approach taken in this summary was to normalize the anthropogenic trace metal results to a "conservative" element such as aluminum (i.e. an element that is not believed to be locally enriched). The ratio of the other metals to aluminum should remain constant across a gradient of particle sizes unless there is an enrichment of the other metal (Forstner 1990).

SUMMARY OF RESULTS

Water Quality

Water quality data are provided in Tables 1 and 2. All tables are appended at the back of the report.

Suspended solid concentrations tended to be low at most stations sampled at all survey areas (< 4 mg/L) with the exception of samples collected from tributary mouths (i.e. mouth of the Spanish River: 3-11.5 mg/L; Blackbird Creek: 3-9 mg/L; Pic River: 14 mg/L) and samples collected close to outfalls (e.g. Red Rock WPCP and Norampac pulp and paper mill: 6 mg/L). As well, secchi depth measurements improved with increased distance from suspected contaminant sources and tributary mouths.

Secchi depth was low (spring range: 0.4 to 0.8 m) at stations associated with the Kam River and Mission and McKellar River in Thunder Bay reflecting the high suspended solids concentrations at these stations (spring range: 6.5 to 14.5 mg/L). In the spring and fall suspended solid concentrations were high in the Kam and Mission Rivers with concentrations decreasing towards the river mouths and along a transect extending from the Mission River (including the Mission Bay Disposal Area) (Table 1 & Figure 7). Based on suspended solids data, the water quality of the Kam River impacts the Mission River to a greater extent than the McKellar River. This pattern was reflected in all water quality parameters.

Bacteriological Analysis

With the exception of the Pic River and Thunder Bay, there was no evidence of bacterial contamination in any of the water samples collected. Bacteria counts were high in one sample (*E. coli* and fecal streptococci counts were 280 and 720 counts/100 mL, respectively), collected from the plume that extended from the mouth of the Pic River. Combined with high phosphorus, nitrogen and suspended solid concentrations, the data suggested that the Pic River had extremely poor water quality on that particular day of sampling.

In Thunder Bay, bacterial counts greater than 100 *E. coli* per 100 mL, were detected only in samples collected from the Kam and Mission Rivers in the spring and from one sample near the Mission Bay Disposal area in the summer. The highest counts of fecal streptococci were also present in samples collected from the Kam and Mission Rivers. The Kam River appears to be the source of the contamination.

Total Phosphorus

Overall, the highest total phosphorus concentration was present in the spring water sample collected from the Pic River (1,220 *u*g/L). In general, concentrations were consistently high at the mouth of Blackbird Creek downstream of the pulp and paper mill in Jackfish Bay and downstream of the mill and WPCP outfall in Nipigon Bay. Concentrations were greater than the interim Provincial Water Quality Objective (20 *u*g/L) at these stations. Typically, concentrations decreased with increasing distance from these suspected sources.

In Thunder Bay the highest total phosphorus concentrations were present in water samples collected from the Kam and Mission River (range over three surveys: 48 to 72 *u*g/L) suggesting the Kam River as a source of nutrients (Table 1; Figure 8). The Welcome Island Index station and stations near the old Abitibi outfall had low phosphorus concentrations (range: 4 to 8 *u*g/L).

Nitrogen

Total organic nitrogen concentrations tended to be greater at the mouths of tributaries and near outfalls than at the stations farther offshore. With the exception of Thunder Bay (TON: 664 *u*g/L), the Pic River(TON: 2,398 *u*g/L) and Blackbird Creek (TON: 1,880 *u*g/L), TON concentrations throughout the surveys were less than 500 *u*g/L with most samples less than 300 *u*g/L. Concentrations in Peninsula Harbour were typically less than 100 *u*g/L. However, the opposite was true for inorganic nitrogen. TIN concentrations tended to be higher at the stations located farther offshore and reflected the atmospheric contribution of nitrogen to Lake Superior. Concentrations of TIN were typically less than 350 *u*g/L throughout the survey areas with the exception of Jackfish Bay (range from 312 to 1,645 *u*g/L). The lowest concentrations were present in Nipigon Bay (range from 72 to 262 *u*g/L).

Given the industrial and urban development in the area, it is not surprising that the Kam River is a source of organic material to the bay and has higher concentrations of TON than Lake Superior. TIN concentrations at the upstream station in the Kam (station 802) and at the mouth of the Mission River (station 176) were similar to each other in the spring and fall and consistently lower than TIN concentrations at the remaining stations in Thunder Bay (Figure 9). Since the source of inorganic nitrogen to Lake Superior is likely atmospheric, the smaller area of the Kam River compared with the lake is likely responsible for the lower TIN concentrations in the rivers. However, consistently, for all three surveys, the highest concentration of inorganic nitrogen was detected at the mouth of the Kam River downstream of the STP suggesting the STP as a source of nitrate and ammonia/ammonium.

Chloride

Chloride concentrations in general were highest throughout the Spanish River survey area (range 5 to 20 mg/L) and in particular at the mouth of Blackbird Creek in Jackfish Bay (maximum concentration 166 mg/L). The remaining stations in the Jackfish Bay survey area and all stations in Nipigon Bay and the Pic River area had similar concentrations which tended to be less than 4 mg/L.

In Thunder Bay results for chloride were similar to patterns for suspended solids, TP and TON concentrations and bacteria. In general, the Mission and McKellar River showed enrichment of Cl due to loadings from the Kam River. Concentrations in all three rivers ranged from 6.8 to 10.6 mg/L in the spring compared with 1.2 mg/L at the Welcome Island Index station. The lowest Cl concentrations were present in the summer but the gradient between the Kam, Mission, McKellar River and the Welcome Island Index station was maintained. Although the Kam is considered a source of Cl to the bay, the concentrations were at least two times lower than concentrations detected in tributaries to Lake Erie and Lake Ontario (Richman, 2001; MOE unpublished data).

Trace Metals

Although chromium and aluminum concentrations exceeded the PWQO (Cr VI-1 *u*g/L, Al-75 *u*g/L) at several stations in the survey this data must be reviewed with several caveats in mind.

The observed high concentrations of Al were related to the high suspended solids concentrations in the water samples since samples analysed for this survey were not filtered. However, the PWQO for aluminum (75 *u*g/L) is based on total Al measured in a clay-free sample making comparisons with the PWQO difficult.

Comparisons of the Cr data with the PWQOs for Cr VI should be made with the caveat that it is unknown whether the concentrations provided for total Cr represent Cr VI or Cr III or some proportion of the two ionic states. The concentrations were also at trace levels. Concentrations of Cr exceeded the guideline for Cr VI at most stations in the surveys. However, the highest concentrations were typically associated with Nipigon Bay, the Kam and Mission Rivers in Thunder Bay.

In general, the highest concentration of most metals (Cu, Mn, Pb, Ni, and Zn) in water, although not greater than the PWQOs, were present in samples collected from the tributaries in Thunder Bay compared with the Welcome Island Index station and stations near the old Abitibi outfall and Provincial Papers. This data suggested that the Kam River is a source of these metals although the higher concentrations can also be related, in some cases, to the suspended solid concentrations.

Nickel concentrations exceeded the PQWO (25 *u*g/L) in one sample collected from the Spanish River in the spring. Nickel concentrations approached the PWQO at the remaining stations in the survey area during the spring survey. However, concentrations in the Spanish River survey area decreased in the summer and fall.

Mercury

With only a few exceptions at each survey area, Hg concentrations were low. There was no relationship between the suspended solid concentrations and Hg concentrations ($r= 0.0044$) and there was no apparent seasonal pattern. In general, the highest concentrations were detected in

samples collected from the Spanish River and the Pic River in the summer. For the Spanish River, the high concentrations were present in samples collected from the Whalesback Channel (6-11 ng/L), while the remaining samples in the area over the three surveys ranged from 0.5-3.45 ng/L.

In the Pic River the highest concentrations in the spring and summer ranged from 6 to 10.6 ng/L while remaining concentrations ranged from 0.15 to 3.3 ng/L. The lowest concentrations in general were present in the fall survey. High Hg was associated with the plume extending from the river.

Concentrations in Nipigon Bay ranged from 0.3 to 2.55 ng/L for all three surveys with the exception of two samples collected in the summer that were 4.9 and 11.1 ng/L collected from stations downstream of the mill and WPCP. However, the sample collected from the station closest to these two facilities (station 459) had lower Hg concentrations (2.1 and 2.55 ng/L) confounding the notion that they were the source of the Hg.

The highest Hg concentrations in general in the Jackfish Bay area were present at the mouth of Blackbird Creek (5.7 ng/L). Hg concentrations at the remaining stations in Jackfish Bay did not appear to follow any consistent pattern and ranged from 0.7 to 2.85 ng/L. Terrance Bay, which served as a reference area for Jackfish Bay, had Hg concentrations that ranged from 0.45 to 1.3 ng/L.

Mercury concentrations in water collected from Thunder Bay followed the same pattern as the other metals (i.e the highest concentrations were associated with the Kam River and Mission River). Mercury concentrations decreased towards the mouth of the Kam and in the McKellar River and with increasing distance along the transect from the Mission River. This pattern was consistent for all three surveys. Although the pattern may be related to the suspended solid concentrations, the correlation between Hg and suspended solids was not as strong in the summer (r=0.72) or fall (r=0.47) compared with the spring (r=0.92).

High Hg concentrations were also present in samples collected outside the Provincial Papers filtration bed. This was consistent for all three surveys suggesting a source of Hg within the filtration bed. This data was also consistent with the sediment data which showed high concentrations of Hg. The site has been historically contaminated with mercury and data were consistent with data collected in a previous study in 1997 and 1998 prepared by Beak International INC (Beak 1999).

Mercury concentrations in water collected from Peninsula Harbour were low despite the high concentrations of Hg in the sediment. Concentrations among the stations were similar and lower in Peninsula Harbour than Thunder Bay.

Resins and Fatty Acids, Phenols and Chlorinated Phenols

With the exception of trace concentrations (<0.8 *u*g/L) of unfiltered reactive phenolics in a few samples collected from the mouth of Blackbird Creek, Moberly Bay, Thunder Bay and Nipigon Bay, resins and fatty acids, chlorinated phenols and acid, base, neutrals were not detected in any water samples collected within the survey areas. Trace concentrations were below the PWQO for phenols which is 1 *u*g/L. Water samples were not submitted for the acid, base, neutrals in the fall survey.

Sediment Quality

Sediment quality data are provided in Tables 3 to 7.

Sediment Physical Qualities and Metal Concentrations

Sediment samples collected from the study areas had variable physical characteristics, which can influence contaminant concentrations. Generally, soft sediment was targeted for collection. However, there were stations sampled that had sediment particularly high in sand content (e.g. mouth of the Spanish River, Blackbird Creek (Jackfish Bay), Kam River mouth, downstream of the STP in Peninsula Harbour, and most samples collected from the Pic River (Table 3). This physical difference will affect the sediment metal, TOC and loss on ignition concentrations, which tend to be positively correlated with particle size. Accordingly, sediment metal data were normalized to Al to account for the particle size differences and facilitate the comparison of metal and nutrient data among stations as an indication of proximity to source. The ratio of the other metals to aluminum should remain constant across a gradient of particle sizes unless there is an enrichment of the other metal (Forstner 1990). The Al normalized data can be provided on request.

With the exception of TOC in Nipigon Bay and Thunder Bay, As, Fe, Cu, Mn and Ni in the Spanish River survey area, and Fe and Hg in Thunder Bay and Peninsula Harbour, contaminant concentrations were all less than the PSQG Severe Effect Level (SEL) suggesting limited biological impacts due to trace metal contamination at the stations in the survey. The area downstream of the Spanish River (Whalesback Channel) does show significant metal contamination as does the area near Provincial Papers in Thunder Bay and Jellico Cove (Peninsula Harbour).

Typically, Cr, Cu, Fe, Mn, Ni, TKN and TP concentrations in sediment in all study areas (with the exception of the Pic River), were greater than the Lowest Effect Level (LEL) at most stations (Table 3). The highest concentrations in general were present in the Spanish River area. Sediment concentrations for most metals were similar in Jackfish Bay and Nipigon Bay. However, when metal concentrations were normalized to Al to adjust for differences in particle size, there appeared to be some enrichment of Cd, Cr, Cu and Zn at the Moberly Bay station (station 702-Jackfish Bay). With the exception of TKN, sediment collected from the Pic River survey area did not exceed any SQG. This was likely due to the high sand content of the samples (>84%). When the sediment metal data was normalized to Al, the ratios calculated for stations in the Pic River were similar to ratios calculated for Jackfish and Nipigon Bay. Cadmium concentrations were greater than the LEL only in sediment collected from Jackfish Bay and the Spanish River area. While Hg and Pb concentrations were only higher than the LEL at one station in Nipigon Bay and in the Spanish River survey area, respectively.

In some cases, exceedances of the LELs may be typical for the Lake Superior basin and reflect the regional geology rather than due to industrial discharges. The Jackfish Bay Stage 1 RAP Report (1991) suggested that only Hg, Zn, TKN and TOC were associated with the mill effluent and elevation of other metals were likely associated with the natural geology. Accordingly, the contaminant data was compared with background values for the whole Great Lakes basin (pre-colonial sediment horizon) (Persaud et al. 1992), and with values specific to Lake Superior (Mudroch et al. 1988) (Table 3). However, although the data collected by Mudroch et al. was specific to Lake Superior, it was only based on one sample. This comparison showed that with few exceptions (e.g. Spanish River survey area), most contaminant concentrations were either below or within the background range provided. As and Ni concentrations in the Kam River were greater than the Persaud et al. background values as were Cr, Cu and Zn concentrations.

Mercury concentrations at the Thunder Bay Index station also exceeded the Persaud et al. background concentration as well as concentrations of Ni and Pb.

TOC and LOI were extremely high outside the Provincial Papers filtration bed (station 465 - range:180 mg/g to 380 mg/g and 360 to 710 mg/g respectively). Field crew described the samples as "100% pulp from the mill discharge". The samples consisted of a grey and white fibrous paper material consistent with previous sampling surveys in the area (Ontario Ministry of Environment et al. 1991). The data suggested that the filtration bed is not adequately retaining the pulp discharged to the area. Further study by Beak in 1997 and 1998 delineated the spatial extent of the elevated TOC and Hg concentrations (Beak 1999). However, impacts on the local benthic community structure should be investigated. Mercury also exceeded the SEL in one replicate sample collected from this station (5.5 *u*g/g), but the remaining two replicates had lower concentrations (0.49 and 0.97 *u*g/g). The sediment within the filtration bed has a history of Hg contamination suggesting that the outlier is likely a real value and the areal extent of contamination highly variable. This station also had the highest concentrations of Pb, TKN, Cr, Cu and Zn. With the exception of "sediment" (pulp) collected from outside the filtration bed and Welcome Island, Hg concentrations were all less than the LEL in the Thunder Bay area. Mean Fe concentrations were greater than the SEL at two stations in Thunder Bay; in the Kam River where it joins with the Mission River (station 802) and at the Welcome Island Index station.

Of note were the two stations in Jellicoe Cove (Peninsula Harbour), where Hg concentrations ranged from 8.4 to 21 *u*g/g (at station 276 near the wharf) and from 3 to 4 *u*g/g at station 279. These results were not surprising given the history of Hg discharged from the former chlor-alkali plant (closed 1977). Mercury has historically been a contaminant of concern in Jellicoe Cove (Peninsula Harbour RAP Team, 1991;1997). Although concentrations of Hg did not exceed the SEL at the Hawkins Island station, concentrations were still enriched relative to the Index station in Beatty Cove and the stations SW of the Penninsula (Table 3). When the data were normalized to Al, the Hg concentration in sediment collected from station 276 in Jellicoe Cove was at least 35 times greater than the concentration in sediment collected from Beatty Cove. The sediment collected from Hawkins Island was twice as high as the Beatty Cove sediment. This pattern of sediment Hg contamination was consistent with data collected in 1973 and 1984 (Peninsular Harbour RAP Team 1991).

Organochlorine Pesticides, Chlorinated Benzenes and Polychlorinated biphenyl (PCBs)

Chlorinated benzenes were not detected in sediment samples collected from any of the study areas with the exception of trace concentrations of hexachlorobenzene in sediment collected outside the Provincial Papers' filtration bed and in samples collected from Peninsula Harbour. In Peninsula Harbour, trace concentrations of hexachlorobenzene were detected in sediment collected from station 468 on the northeast side of Hawkins Island and at the Index station in Beatty Cove (as well as pentachlorobenzene at station 468). Detectable concentrations of several chlorinated benzenes were present in sediment collected from Jellicoe Cove, near the wharf, at station 276; 135-trichlorobenzene,1235-tetrachlorobenzene, hexachlorobenzene and pentachlorobenzene suggesting the possibility of a local source (Table 4).

Organochlorinated compounds were detected in only a few samples (Table 5). Trace concentrations of β-BHC, α-chlordane, heptachlor, oxychlordane, p'p-DDE and p'p-DDT, were detected consistently at one or two stations in the Whalesback Channel (downstream of the mouth of the Spanish River), and in Nipigon Bay downstream of the mill and WPCP outfalls (station 459) and at several stations in Thunder Bay. Trace concentrations of total PCBs were also detected at two stations downstream of the mill and WPCP in Nipigon Bay (range 80 to 200 ng/g) suggesting a local source. Concentrations were greater than the PSQG LEL, which has

been set at 70 ng/g. Kirby (1986), detected PCBs in the mill effluent and receiving water in 1983.

The highest concentrations of PCBs in Thunder Bay were detected in sediment from the Welcome Island Index station (range: 40 ng/g to 100 ng/g) (Table 5). PCBs were detected only sporadically at the remaining stations.

In Peninsula Harbour the highest PCB concentrations were detected at the Index station in Beatty Cove (range: 160 to 180 ng/g) and near the wharf in Jellicoe Cove (station 276) (range: 180 to 240 ng/g). PCBs were also detected at station 468 (Hawkins Island) but at lower concentrations. When the data were normalized to TOC, concentrations were similar at all three stations. PCBs were not detected at the remaining stations in Marathon likely because of the high sand content of the samples. More detailed sampling could identify if the areal extent of the PCB contamination is consistent with the Hg contamination thereby suggesting a common source.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs do not appear to be a significant biological concern at any of the stations sampled in this survey. Sediment collected from all stations, with the exception of the Whalesback Channel, had concentrations of PAHs below the LEL (2 ug/g) (Table 6). However, only one sample collected from the station in the Whalesback Channel had a total PAH concentration of 3,960 ng/g. The remaining samples had concentrations that ranged from below the detection limit to only 120 ng/g suggesting that the other sample should be interpreted with caution.

The most frequently detected compounds were benzo(b)fluoranthene, fluoranthene, phenanthrene and pyrene. PAHs were detected in all areas of study with the exception of the Pic River. Concentrations were generally low (trace) for most compounds. The highest mean concentration of total PAH was present in sediment collected from station 459 in Nipigon Bay (mean 640 ng/g, SD 124.9 ng/g) and at one station in the Jackfish Bay area downstream of Backbird Creek in Moberly Bay (mean 1,795 ng/g, SD 125.8 ng/g).

Consistent with the chlorinated benzene data, the highest concentrations of PAHs were present at the Jellicoe Cove site (station 276) where detectable concentrations of several compounds were present suggesting a local source (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, naphthalene, pyrene and phenanthrene) (Table 6). Concentrations at the remaining stations were low or non-detectable. When the PAH concentrations were normalized to TOC, the data still identified station 276 as being enriched with PAHs.

Polychlorinated-p-dibenzodioxins and Polychlorinated dibenzofurans

Sediment was collected from only one or two stations from each survey area for dioxins and furans analysis. The highest concentrations were present in sediment collected from the Spanish River Index station (Table 7). Toxicity Equivalency Factors (TEFs) have been used as a measure to express the toxicity of different dioxins and furans on a common basis. TEFs were assigned to individual dioxins and furans on the basis of how toxic they were in comparison with the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (T4CDD), which was assigned the value of 1.0. When concentrations of individual isomers are converted to toxicity equivalents of 2,3,7,8-T4CDD they are then summed to yield a total toxic equivalents (TEQ). The World Health Organization TEFs for the protection of humans and mammals from August 1997 were used for the calculations (van den Berg et al. 1998). The calculated TEQs can be compared with sediment quality guidelines. Ontario does not have a Sediment Quality Guideline (SQG) for dioxins and

furans at present, however, the interim SQG for the No Effect Level for 2,3,7,8-T4CDD has been set at 25.7 pg/g.

The TEQs at the Spanish River Index station (49 and 51 pg/g) suggested that the sediment is contaminated with dioxins and furans, particularly when compared with the interim provincial SQG and TEQs for the remaining stations which were less than 10.5 pg/g. When values were normalized for sediment TOC concentrations, these two samples still remained the highest compared with samples collected from the remaining stations. The likely source of the dioxins and furans was a pulp and paper mill located upstream in the Spanish River. The highest concentrations of 2,3,7,8 tetrachlorodibenzo-p-dioxin (the most toxic form of dioxin) and 2,3,7,8 tetrachlorodibenzo furan were also present in sediment collected from this station.

Dioxins and furans were not detected in sediment collected from the Pic River or Blackbird Creek (Jackfish Bay) although low concentrations of dioxin-like PCBs were detected in sediment from Blackbird Creek.

At most stations, octachlorodioxin was present at the highest concentrations compared with other congener groups. Concentrations of dioxin-like PCB in sediment collected from Nipigon Bay downstream of the local mill outfall were high compared with concentrations from other stations and higher than the octachlorodioxins. In fact, the dioxin-like PCBs made up more than half of the TEQ value. This was in contrast to the other samples where dioxin-like PCBs typically represented a small fraction of the TEQ. The presence of these compounds is likely associated with the mill since this station is located only 30 m downstream of the mill outfall.

DISCUSSION

Nipigon Bay

With few exceptions, water and sediment samples collected from Nipigon Bay did not suggest significant environmental impairments. There was some sediment contamination (i.e. dioxin-like PCBs, Hg, PAHs, PCBs, TOC), in the vicinity of the local pulp and paper mill and WPCP, but concentrations were not high enough to suspect impacts on the benthic community. In general, sediment samples showed that metal concentrations (Cr, Cu, Fe and Ni), were typically greater than the provincial SQG LEL at most stations. Arsenic, Pb, Zn and Hg (with the exception of station 459), were below the LEL at all stations. This was consistent with historical data, which did not indicate significant metal contamination but did show enrichment of Hg which was associated with the mill effluent (Ontario Ministry of Environment et al. 1991a).

Concentrations of nutrients (with the exception of total phosphorus), and bacteria in water were low. TON was slightly elevated downstream of the pulp and paper mill and local WPCP. However, in general, at all stations, TIN and TON concentrations were typically less than 200 *u*g/L with the exception of the stations closest to the mill and WPCP outfalls. The highest concentrations were in the spring coinciding with the highest concentrations of suspended solids (4 to7 mg/L in the spring compared with < 5 mg/L in the summer and fall). Total phosphorus concentrations were typically between 4 and 8 *u*g/L at all stations sampled in the spring and summer survey with the exception of stations 459 and 1200 located 30 and 500 m, respectively, downstream of outfalls for the pulp and paper mill and Red Rock WPCP. Concentrations of TP were 40 *u*g/L at station 459 and 24 and 32 *u*g/L at station 1200 in the spring. Temperature and conductivity (measured by the Hydrolab), suggested the presence of a surface plume at station 459. The water temperature at 0.4 m below the surface ranged from 11 to 12.8 °C and

conductivity ranged from 209 to 281 uS/cm while temperature at 1 to 1.5 m was 8.3 °C and conductivity was 150 to 157 uS/cm. In the summer, only station 459 had higher TP concentrations (mean: 11 ug/L) than the other stations sampled and there was no evidence of a surface plume. Concentrations of TP in the fall were similar at all stations with the exception of the station near Frog Island where TP was 20 ug/L. Chloride concentrations were low at all stations (<3 mg/L). Organic compounds in general and compounds associated with the pulp and paper industry in particular, were routinely below the method detection limit.

Water quality appears to have improved since the 1983 survey, which documented impairments to water and sediment due to effluent from the pulp and paper facility. In 1983, PWQOs for Cd, Fe, Hg, Cu and Zn were exceeded as were objectives for reactive phenol and guaiacol (Ontario Ministry of Environment et al. 1991a). In 1999 metal concentrations and parameters associated with the pulp and paper mill were all less than the PWQOs.

All water quality data from the survey area were consistent with data collected from the Nipigon Bay Index station which was located off shore in deeper water. Only Al concentrations in the spring samples were higher at the nearshore stations when compared with the Index station.

Jackfish Bay

As with the data from Nipigon Bay, there were slightly elevated concentrations of some contaminants but sediment samples did not suggest significant environmental impairments. Sediment was contaminated in the bay, but concentrations were not high enough to suspect impacts on the benthic community. Concentrations of Cd, Cr, Hg, Zn, PAHs, TKN, TOC were highest at the station located about 300 m downstream of the mouth of Blackbird Creek (station 702). When sediment data was normalized to Al, concentrations at this station remained enriched with Cd, Hg and Zn relative to the other stations in the survey area. According to the RAP Stage 1 report (Jackfish Bay RAP Team, 1991), Hg and Zn have been linked to the effluent from the local pulp and paper mill located in Blackbird Creek about 14 km upstream from Moberly Bay.

Although concentrations were low, the Jackfish Bay station (451) located about 2.8 km downstream of the creek showed some enrichment of Cu and Pb relative to other stations sampled in the area. The sediment collected from the mouth of Blackbird Creek did not show any evidence of contamination. However, the samples were extremely high in sand (97%). Even when the data were normalized to Al, the ratio suggested low metal concentrations at this station. Arsenic, Pb, Hg and Zn (with the exception of station 702 and one sample from station 288), were below the LEL at all stations. All the sediment data were extremely consistent with historical data, suggesting little change in sediment quality over time.

Impacts from the mill effluent on water quality throughout Moberly Bay and the northern and western portions of Jackfish Bay that were obvious in the 1981 and 1987/89 surveys (i.e. nutrients, metals and phenols greater than the PWQO, high suspended solids), were not evident in the 1999 survey. The installation of secondary treatment at the mill has likely contributed to the improvement in water quality throughout the bay. Although it should be noted that this survey only represents one day of sampling per season and movement of the effluent plume is highly dependent on wind and current direction. However, notwithstanding the apparent improvement in water quality in Moberly Bay and Jackfish Bay, chloride concentrations and conductivity were clearly elevated at the mouth of Blackbird Creek similar to historical data, as were concentrations of TIN, TON and TP and suspended solids particularly in the spring and summer surveys. TP in the spring was 144 ug/L at the mouth of the creek compared with concentrations in Moberly Bay and Jackfish Bay that were 16 and 4 ug/L respectively. Also of note, were extremely high TP (440 ug/L) and ammonia/ammonium concentrations at this station

in the summer (1.16 mg/L). Dissolved oxygen was also lower at this station (5.5 mg/L) compared with all stations located further downstream (9 mg/L) and conductivity, measured using the Hydrolab was as high as 1,351 uS/cm. In general, water quality at the mouth of Blackbird Creek was consistent with the 1987/88 data and does not appear to have improved.

Temperature and conductivity data collected using the Hydrolab suggested the presence of a surface plume at the mouth of Blackbird Creek in the spring. The temperature ranged from 12-13 °C and the average conductivity value measured 822 uS/cm at 0.6 m depth at station 701. At 1.1 m depth, the temperature ranged from 7-11 °C and average conductivity was 477 uS/cm. Further downstream at station 702 in Moberly Bay, the water temperature from the surface to a depth of 17 m ranged from 5.5-6.8 °C and conductivity at the surface was 150 uS/cm. Downstream of Moberly Bay (station 710), water temperature from the surface to a depth of 29 m remained consistent at 4.25 °C and conductivity was 101 uS/cm. Secchi depth measurements also improved with increasing distance away from the mouth of Blackbird Creek (from 0.2 m to 6.5 m in Jackfish Bay). TIN concentrations at the mouth of the creek were typically lower than concentrations at the remaining stations that were similar to concentrations in Lake Superior. The only metal consistently greater than the PWQO was Cr although given that the analysis was for total Cr, it is unclear what portion of the data represents the two ionic states applicable to the PWQO.

In general, all parameters showed a downward gradient with increasing distance from Blackbird Creek. Concentrations of most parameters in water samples collected from the Index station (288) were similar to concentrations detected in water collected from stations 710 and 451 which were located farther downstream of Moberly Bay.

Pic River

With the exception of one station (20), the sediment samples collected from the mouth of the Pic River and the nearby embayment were high in sand. Accordingly, metal and nutrient concentrations were low. When the data were normalized to Al to account for the high sand content of the samples the ratios suggested similar sediment quality to other areas in the survey. Sediment quality in the Pic River and embayment were not enriched with metals or nutrients and all concentrations were less than the LEL with the exception of TKN.

Although a sample was not collected directly from the mouth of the river in the spring, water collected from station 457 (west of the river mouth) was from the plume extending from the Pic River. The plume was extremely turbid with suspended solid concentrations at 3,520 mg/L. *E. coli* and fecal streptococci counts were 280 and 720 counts/100mL, respectively. This was in contrast to data collected from all the other surveys. As well, nutrient concentrations were high compared with the other stations sampled in the area. TON concentrations were 2,398 ug/L at station 457 compared with concentrations that were less than 158 ug/L at the remaining stations. TP was also high at 1220 ug/L compared with concentrations that were between 4 and 12 ug/L.

In the summer and fall, water collected from the river mouth and the plume extending into the embayment had higher concentrations of suspended solids, TP and organic nitrogen than the embayment station (station 20) and the Heron Bay station (21) located north of the Pic River. In contrast, stations 20 and 21 consistently had higher concentrations of TIN than the Pic River. With the exception of Al and Cr, metal concentrations were less than the PWQOs. High Al concentrations at the river mouth and stations 457 and 454 were likely associated with the higher suspended solids concentrations in those samples.

Although the surveys were representative of one day per season, the spring data in particular

suggested that the Pic River has impaired water quality and could be a significant source of nutrients and bacteria.

Spanish River

Sediment samples collected from stations located downstream of the mouth of the Spanish River were contaminated with Cu, Fe, Mn and Ni. Concentrations of these metals in sediment at several stations were greater than the SEL. The highest concentrations were at two stations in the Whalesback Channel (station 401 and 209), but the impact from contaminant sources upstream in the Spanish River was evident throughout the area extending into Aird Bay and the McBean Channel. The station located at the mouth of the river (400) had the lowest metal concentrations, in part, due to the high sand content of the sample but was indicative of the flow pattern from the river suggesting deposition zones in the Whalesback Channel. This pattern of sediment contamination was consistent with sediment surveys in the 1980's and 1990's and was attributed to the local mining and smelting industry which has been operating in the area since the 1930's (Spanish Harbour RAP Team 1993).

Sediment collected from the Index station (39) was also contaminated with dioxins and furans. High TEQ values were generally due to high concentrations of 2,3,7,8-tetrachlorodibenzofuran and octachlorodibenzo-dioxin. The dioxin contamination was likely a result of effluent discharged from E.B Eddy Forest Products pulp and paper mill to the Spanish River.

Since 1993, the E.B. Eddy mill has been upgraded and the Espanola WPCP installed secondary treatment. Accordingly, downstream water quality was expected to improve when compared with water samples collected from the late 1980's when Ni and Cu concentrations were greater than the PWQOs in at least 50% of the samples collected from the Spanish River. As well, Pb, Cd, Fe and Zn concentrations were occasionally greater than the PWQOs. In the 1999 survey, all metal concentrations were below the PWQO with the exception of Ni (PWQO: 25 *u*g/L), at the mouth of the Spanish River in the spring (27.6 *u*g/L +/- 1.7 *u*g/L). Ni concentrations were consistently high at all stations in the survey area (21 *u*g/L) during the spring. In the summer and fall concentrations were lower but the highest concentration was always present at the station at the mouth of the river.

Chloride concentrations were, in general, higher in the Whalesback Channel and surrounding stations than in samples collected from other survey areas. Nutrient concentrations (nitrogen and phosphorus) and suspended solids were consistent among the sampling stations and generally low. TIN concentrations were typically less than 300 *u*g/L and TP concentrations were less than 12 *u*g/L. The highest concentrations tended to be present in samples collected from the mouth of the river.

The Index station was located downstream of the mouth of the Spanish River in the Whalesback Channel. Concentrations of all parameter in samples collected from the Index station were similar to water quality throughout the survey area.

Thunder Bay

Water quality impairments in Thunder Bay are primarily due to discharges from the forest product industry (pulp and paper and wood preservation). Direct discharges to Thunder Bay include Abitibi-Price Inc. (Fort Williams Division, Thunder Bay Division and Provincial Papers Division) and Northern Wood Preservers Ltd. The Ontario Hydro Thermal Generating Station, Canadian Pacific Forest Products, Ogilvie Mills and the Thunder Bay STP discharge to Lake Superior via the lower Kam River. Other local industries also contribute to water quality

impairments. However, over the past thirty years water quality has improved following improvements made by industry.

The Thunder Bay RAP identified the Kam River, the inner Thunder Bay Harbour and Chippewa Beach as the areas of most serious degradation (Ontario Ministry of Environment et al. 1991). Results in 1999 were similar to previous studies in that the most degraded area was identified as the lower Kam River with a zone of impact that radiates out from its delta.

Previous surveys in 1983 and 1985/86 have identified the Kam River as a source of nutrients, metals and conventional parameters such as Cl and BOD (Ontario Ministry of Environment et al. 1991). In 1983, Cl and TP concentrations were higher downstream of the Canadian Pacific Forest Products outfall than upstream, and high nutrient (TP and nitrogen) concentrations were detected in water in the Kam downstream of the STP. The 1999 water quality data for TP, TIN and Cl followed a similar pattern. TP was greater than the PWQO in samples associated with the Kam River (range 48 to 72 *u*g/L). The Kam River is a source of organic material to the bay and has higher concentrations of TON than Lake Superior. The source of inorganic nitrogen to Lake Superior is likely atmospheric, the smaller area of the Kam River compared with the lake is likely responsible for the lower TIN concentrations in the rivers. However, consistently for all three surveys, the highest concentration of inorganic nitrogen was detected at the mouth of the Kam River downstream of the STP suggesting the STP as a source of nitrate and ammonia/ammonium. The 1999 data for metals was also consistent with earlier studies whereby concentrations of metals in general were higher in the Kam River than at other stations sampled.

Trichlorophenols, resin acids and fatty acids were detected in water collected from the mouths of the tributaries and from the Kam River in the 1983 survey, and pentachlorophenol and trichlorophenol were detected in samples collected from stations near Welcome Island. In 1985, total resin acids and dehydroabietic acid was greater than the PWQO in the Kam and Mission River on occasion and trichlorophenols were present at trace concentrations. The pulp and paper mills in Thunder Bay were the sources of these compounds. In comparison with these earlier surveys, in 1999 only reactive phenols were detected in samples collected from Thunder Bay. In the spring, samples associated with the Kam River had trace concentrations of reactive phenols while in the fall, water samples from all the stations in the survey had trace concentrations although they were consistently below the PWQO.

Previous studies have identified three areas with sediment contamination; the Kam River and its delta, the inner harbour and the area adjacent to the Northern Wood Preservers (NWP) site in the inner harbour (Ontario Ministry of Environment et al.1991). The NWP site has been extensively studied so it was not included in this survey. The results from the survey in 1999 were similar to the survey in 1985 both in terms of the concentrations detected at the stations and the patterns of contamination. However, in general, Cu, Cr and Hg concentrations were lower in 1999 than in 1985.

When normalizing the sediment data to Al, the sample collected from outside the Provincial Paper filtration bed was enriched with Hg, Pb, Cu, and Cd compared with the remaining stations in the survey, followed by the Welcome Island Index station and station 802 in the Kam River which also showed enrichment relative to the remaining stations in the survey. Mn and Fe concentrations were very low in the sample from the filtration bed compared to the other stations while As was enriched in the Kam, the Mission and McKellar Rivers.

Peninsula Harbour

There are two point sources discharging into the Peninsula Harbour study area: the Fort James Marathon kraft pulp mill (formerly James River-Marathon Ltd.) and the town of Marathon WPCP. Prior to 1983, the kraft mill discharged its effluent via four outfalls directly to Peninsula Harbour (which included Hg from the chlor-alkali plant). This historical discharge of Hg (from improperly treated wastewater, spills, leaks and vapour loss) (Peninsula Harbour RAP Team 1991), was responsible for the Hg contamination in the sediment in Jellicoe Cove which is still evident from the 1999 survey. Mercury concentrations in sediment detected at the two stations in Jellicoe Cove (station 276 and 279) were similar to concentrations reported in a 1991 survey (Smith, 1992). Consistent with previous sediment surveys (Jardine and Simpson, 1990), PCB contamination was also detected in sediment from Jellicoe Cove (station 276) and Beatty Cove, although concentrations were lower than in 1984. The PCB contamination is thought to have originated from the pulp and paper mill or the chlor-alkali plant (Smith, 1992). This was also likely the source of the PAHs and chlorinated benzenes detected in the sediment in 1999 at the same station in Jellicoe Cove. The sediment concentration of the other trace metals (Cr, Cu, Pb, Cd, Ni, Zn etc.) in 1999 was similar to concentrations detected in 1984 (Jardine and Simpson, 1990). From 1983 to 1995, effluent from the pulp mill was pumped over the ridge of the Peninsula into a control basin and then discharged offshore into open Lake Superior via a submerged outfall. At times, effluent overflows were still discharged into Peninsula Harbour. In 1995, the kraft mill's outfall was moved further downstream south of the Peninsula (and south of the WPCP), and the effluent was discharged through a submerged diffuser into Lake Superior after going through a secondary treatment basin. Although there were significant water quality improvements in the vicinity of the mill's outfall since the 1970's due to improvements to the mill and the relocation of the outfall in 1983, PWQOs for some metals and organic compounds were exceeded in 1984/85. In contrast, in 1999 the PWQO was not exceeded for any parameters in samples collected upstream and downstream of the new outfall and concentrations of all parameters were similar (nutrients and metals) at the two stations. Parameters typically associated with the mill effluent such as resins and fatty acids, total reactive phenolics and chlorinated phenols were not detected in any water samples. As well, these parameters were not detected in Jellicoe Cove where the mill historically discharged its effluent. Chloride concentrations downstream of the mill were lower in 1999 than in1984/85 (measured near the previous mill outfall) as were TP concentrations.

The WPCP also discharges into Lake Superior south of the Peninsula through a submerged outfall (diffuser). Water quality associated with the plant improved considerably when the plant was upgraded to secondary treatment in 1982. Prior to the upgrade, bacterial contamination was a problem. Consistent with data from 1984/85, bacterial contamination in the study area was low (or below the detection limit).

Water concentrations of ammonia, TKN and nitrate in 1999 were similar to concentrations in 1984/85 as were concentrations of metals in most cases.

The sediment trace metal data was also consistent with previous surveys and highlighted the historic Hg and PCB contamination in Jellicoe Cove. Normalization of the sediment data to Al showed enrichment of As, Cu, Pb and Zn at station 276 in Jellicoe Cove and at the Hawkins Island station relative to stations located south of the Peninsula although in general, with the exception of Hg, concentrations at all stations were not high enough to be of significant biological concern (i.e. < SEL).

RECOMMENDATIONS

The data suggests that sediment quality in Nipigon Bay, Jackfish Bay and the Pic River does not appear to be a significant risk to sediment dwelling organisms. As such, additional sediment surveys are not recommended unless there is reason to suspect additional sources of contamination that were not captured in this survey or the need for a more detailed sediment survey. Data from the Spanish River suggests that sediment contamination in the AOC is persistent and consistent with previous surveys. The Spanish Harbour RAP Stage 2 report has recommended a strategy of natural recovery due to the large area that is contaminated (Spanish Harbour RAP Team 1997). Additional long-term monitoring to assess improvements in sediment quality and benthic community structure is therefore recommended.

Water quality in the Spanish River has improved since studies from the 1980's, but high concentrations of nickel suggest some impairment. Water quality data at the mouth of Blackbird Creek (Jackfish Bay), suggested impairment due to high nutrient concentrations and low dissolved oxygen, although conditions in Moberly Bay and Jackfish Bay have improved greatly since surveys from the late 1980's. Monitoring of water quality in the Spanish River, Blackbird Creek and the Pic River should be repeated in the future. The source of high bacteria and nutrient loads to the Pic River should be investigated further.

The environmental impacts and strategies for management of Hg contaminated sediment in Thunder Bay and Peninsula Harbour is being addressed through the respective RAPs. Future monitoring of these areas should be coordinated with that program.

REFERENCES

Beak International Incorporated. 1999. Mercury investigation in Thunder Bay Harbour sediment - 1997 and 1998. Beak Ref. 20872.2

Forstner, U., and Wittmann, G.T.W. 1983. Metal Pollution in the Aquatic Environment. 2nd Revised Ed. Springer-Verlag. Berlin Heidelberg New York Tokyo.

Forstner, U. 1990. Inorganic sediment chemistry and elemental speciation. In Baudo, R., Giesy, J.P. and H. Muntau (Eds.) Sediments: Chemistry and Toxicity of In-Place Pollutants. Lewis Publishers, United States. 61-106.

Jardine, C.G. and K.J. Simpson. 1990. Water and Sediment Quality Assessment of Peninsula Harbour, Lake Superior - Spring 1984 and 1985. Ontario Ministry of Environment.

Jackfish Bay RAP Team. 1991. Jackfish Bay Area of Concern. Environmental Conditions and Problem Definition. Remedial Action Plan Stage 1.

Kirby, M. 1986. Effect of waste discharge on the water quality of Nipigon Bay, Lake Superior. Ontario Ministry of the Environment.

Krumgalz, B.S., Fainshtein, G. and Cohen, A. 1992. Grain size effect on anthropogenic trace metal and organic matter distribution in marine sediments. Sci. of Tot. Env. 116: 15-30.

Ministry of the Environment (MOE). 1983. Handbook of Analytical Methods for Environmental Samples. Laboratory Services and Applied Research Branch. Toronto, Ontario.

Ministry of the Environment (MOE). 1989a. The determination of trace metals in sediments by the spectro inductively coupled plasma-optical emission spectrometer (ICP-OES). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of the Environment (MOE). 1989b. The determination of mercury in soils, sediments and vegetation by cold vapour-atomic absorption spectrophotometry (CV-AAS). Laboratory Services Branch. Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1994. Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy.

Ministry of Environment and Energy (MOEE). 1994a. The Determination of Polychlorinated Biphenyls (PCBs), Organochlorines (OCs) and Chlorobenzenes (CBs) in Soil and Sediments by Gas Liquid Chromatography-Electron Capture Detection (GLC-ECD). PSAOC-E3270A. Laboratory Services Branch, Quality Management Office. Etobicoke, Ontario. July 18, 1994. 37 pp.

Ministry of Environment and Energy (MOEE). 1994b. The Determination of Polynuclear Aromatic Hydrocarbons in Soil and Sediments by Gel Permeation Chromatography-high Performance Liquid Chromatography (PC-HPLC). PSAPAH-E3350A. Laboratory Services Branch, Quality Management Office. Etobicoke, Ontario. July 20, 1994. 28 pp.

Ministry of Environment and Energy (MOEE). 1995a. The Determination of Total Kjeldahl Nitrogen and Total Phosphorus in Soil and Sediments by Colourimetry (NPSED-E3116A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995b. The Determination of Particle Size on Sediment Samples by Microtrac Particle Size Analyzer Model 7991-2. PZSIZE-E3262A and SMPART-E3128A. Laboratory Services Branch, Quality Management Office. Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995c. The Determination of Polychlorinated Dibenzo-*p*-Dioxins and Dibenzofurans in Soil and Sediment by GC-MS. PSAFD-E3151B.. Laboratory Services Branch, Quality Management Office. Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995d. The determination of solids in water and surface water by gravitmetry (SOLIDS-E3365A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995e. The Determination of Moisture Content, RST, RSTA and LOI of Sediments and Biomaterials by Gravimetry (PHYSOLID-E3139A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995f. The determination of chloride in surface water, sewage and industrial waste by colourimetry (COCL-E3016A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995g. The determination of ammonia nitrogen, nitrite, nitrite + nitrate nitrogen and reactive phosphorus in surface water, drinking water and precipitation by colourimetry (RNDNP-E3364A). Laboratory Services Branch,

Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995h. The determination of total kjeldahl nitrogen and total phosphorus in water, precipitation and soil extracts by colourimetry (RNDNP-E3367A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1995i. Membrane filtration methods for the detection of fecal coliforms, Escherichia coli, Pseudomanas aeruginosa, Fecal streptococci and total aerobic heterotrophic bacteria (MICROMF-E3371A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1996. The Determination of Polychlorinated Biphenyls (PCBs) in Soil and Solid Industrial Waste by Gas Chromatography-Electron Capture Detection (GC-ECD) (PSAPCB-E3153A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1997a. The Determination of Trace Metals in Surface Waters by Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) Using An Internal Standardization Procedure (SWATER-E3391A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1997b. The Determination of Mercury in Water by Cold Vapour-Atomic Absorption Spectrophotometry (CV-AAS) (HGWATER-E3060B). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1997c. The Determination of Arsenic, Selenium and Antimony in Water and Effluents by Hydride Generation-Flameless Atomic Absorption Spectrophotometry (HYD-FAAS) (HYDMISC-E3089A). Laboratory Services Branch, Etobicoke, Ontario.

Ministry of Environment and Energy (MOEE). 1997d. The Determination of total carbon in sediments by the LECO carbon analyzer. CARBONTC-E3142A. Laboratory Services Branch, Etobicoke, Ontario.

Ontario Ministry of Environment, Environment Canada, Ontario Ministry of Natural Resources, Department of Fisheries and Oceans. 1991. Thunder Bay Area of Concern Remedial Action Plan Stage 1: Environmental Conditions and Problem Definition.

Ontario Ministry of Environment, Environment Canada, Ontario Ministry of Natural Resources, Department of Fisheries and Oceans. 1991a. Nipigon Bay Remedial Action Plan Stage 1: Environmental Conditions and Problem Definition.

Mudroch A., Sarazin, L. and T. Lomas. 1988. Summary of Surface and Background Concentrations of Selected Elements in the Great Lakes Sediments. J. Great Lakes Res. 14(2):241-251

Peninsula Harbour RAP Team. 1991. Peninsula Harbour Area of Concern. Environmental Conditions and Problem Definition. Remedial Action Plan Stage 1.

Peninsula Harbour RAP Team. 1997. Peninsula Harbour Remedial Action Plan. Stage 2: Remedial Strategies for Ecosystem Restoration. Draft.

Persaud, D., Jaagumagi, R., and Hayton, A. 1992. Guidelines for the protection and management of aquatic sediment quality in Ontario. Water Resources Branch. Ontario Ministry of the Environment. Toronto, Ontario.

Richman, L.A. 2001. Great Lakes Reconnaissance Survey - Lake Erie Harbours Water and Sediment Quality 1998. Environmental Monitoring and Reporting Branch. Ontario Ministry of Environment. (In press).

Smith, I.R. 1992. 1991 Peninsula Harbour Sediment Study. Great Lakes Section. Water Resources Branch. Ministry of Environment. Draft.

Spanish Harbour RAP Team. 1993. Spanish Harbour Area of Concern. Environmental Conditions and Problem Definition. Remedial Action Plan Stage 1.

Spanish Harbour RAP Team. 1997. Spanish Harbour Area of Concern. Stage 2 - Remedial Actions Towards Ecosystem Restoration..

van den Berg, M., L. Birnbaum, B.T.C. Bosveld., B. Brunstrom, P. Cook, M. Feeley, J.P. Giesy, A. Hanberg, R. Hasegawa, S.W. Kennedy, T. Kubiak, J.C. Larsen, F.X. Rolaf van Leeuwen, A.K.D. Liem, C. Nolt, R.E. Peterson, L. Poellinger, S.Safe, D. Schrenk, D. Tillit, M. Tysklind, M. Younes, F. Waern, and T. Zacharewski. 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ. Health Perspect. 106:775-792.

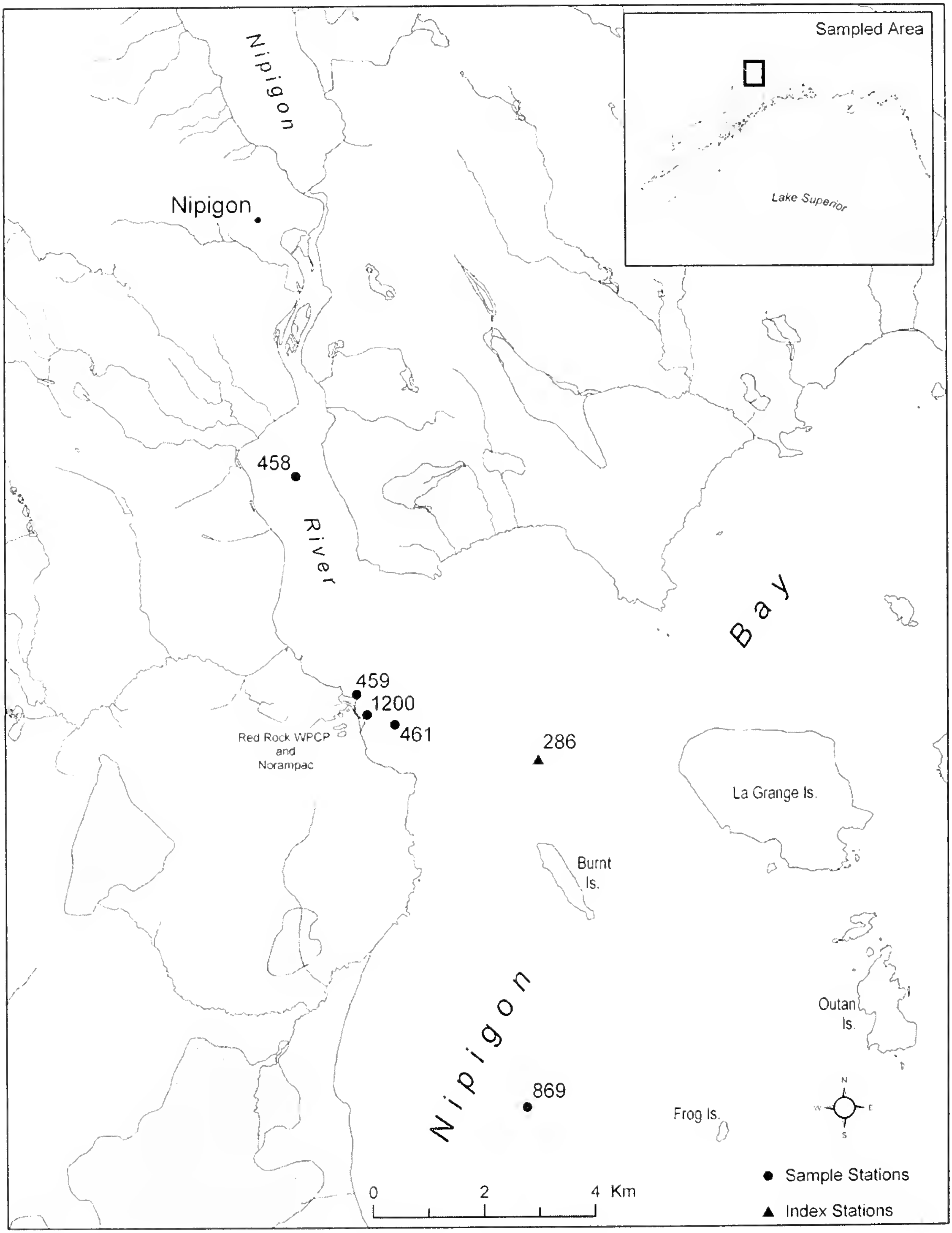

Figure 1: Nipigon Bay sediment and water sampling stations, 1999

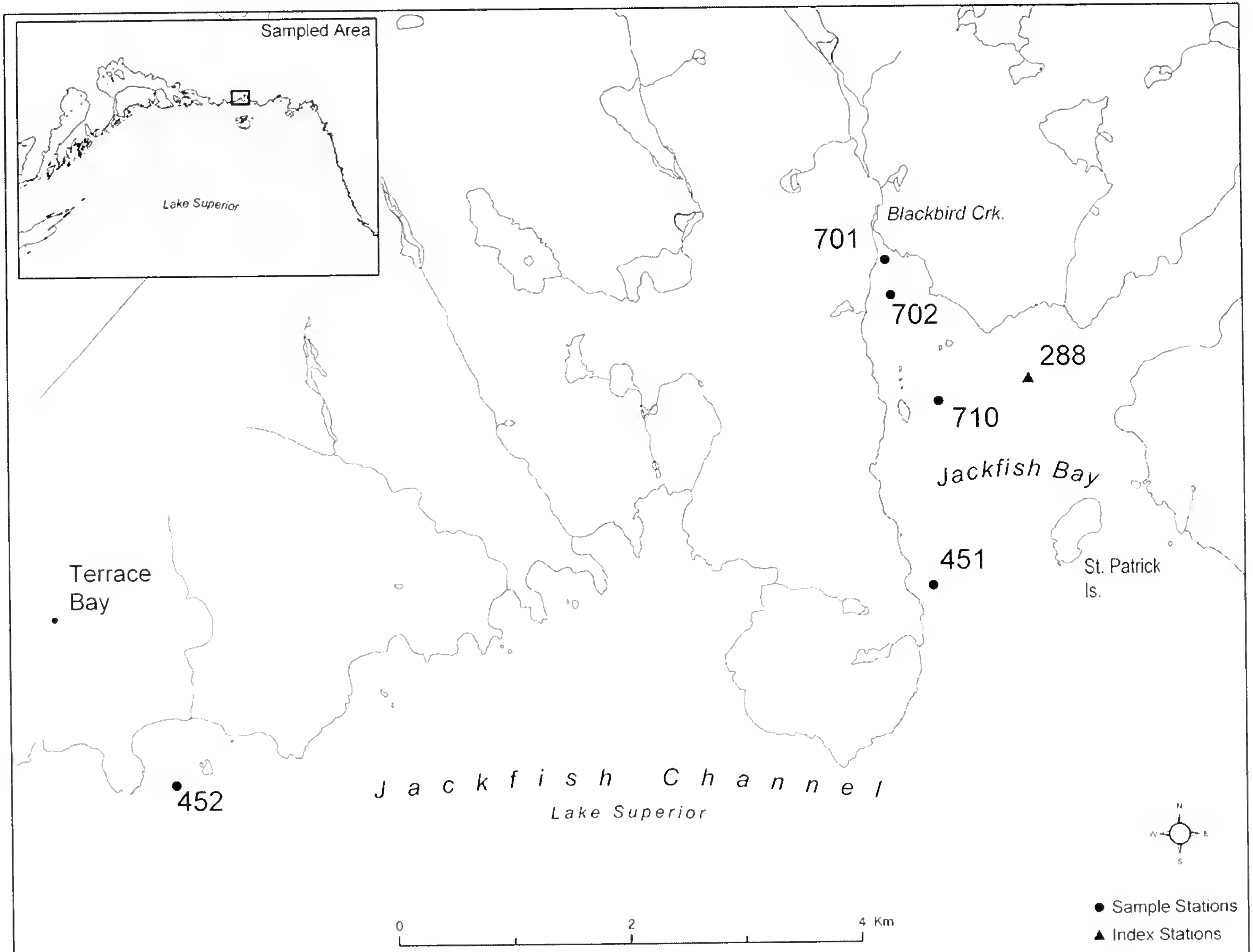

Figure 2: Jackfish Bay sediment and water sampling stations, 1999

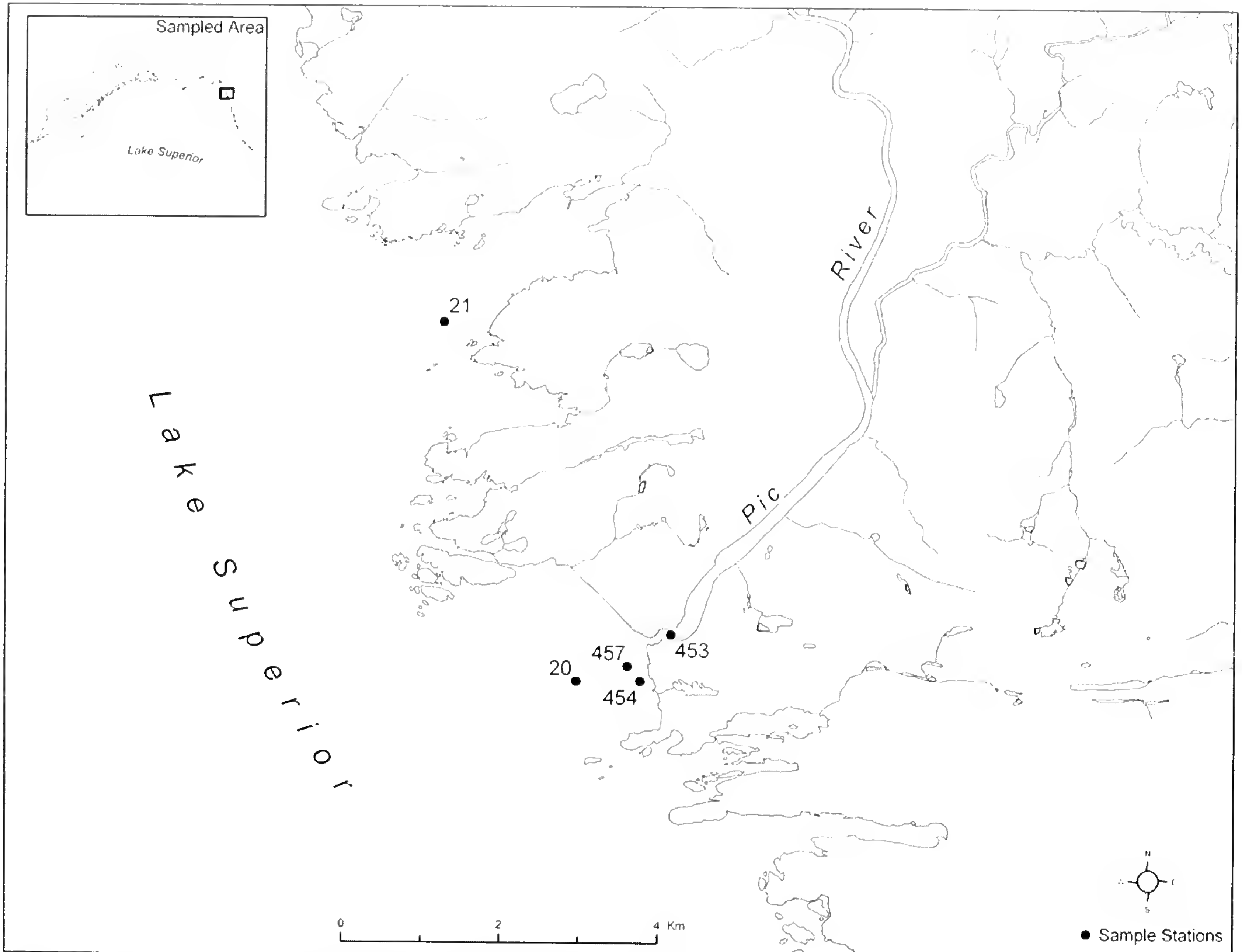

Figure 3: Pic River sediment and water sampling stations, 1999

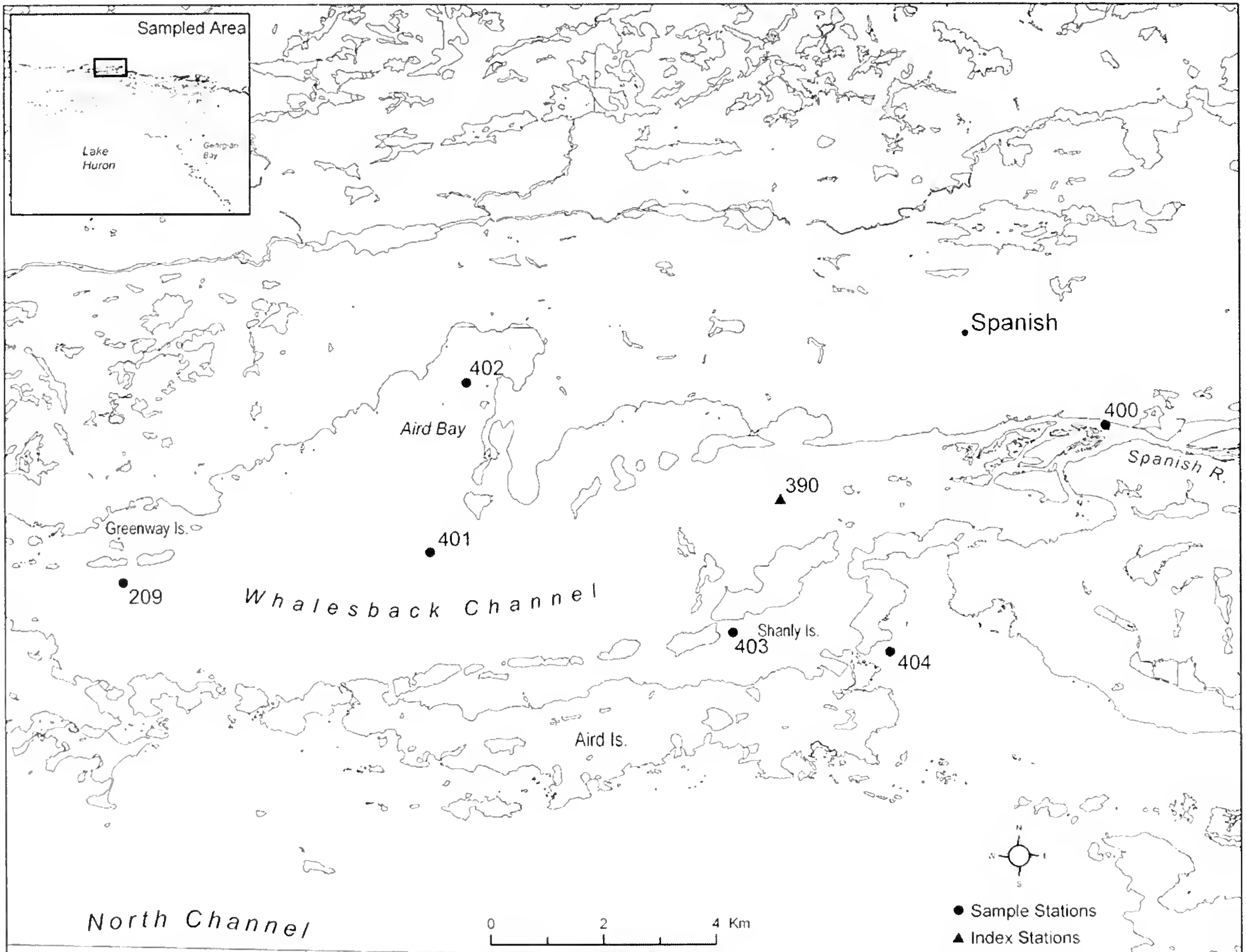

Figure 4: Spanish River (mouth) and Whalesback Channel sediment and water sampling stations, 1999

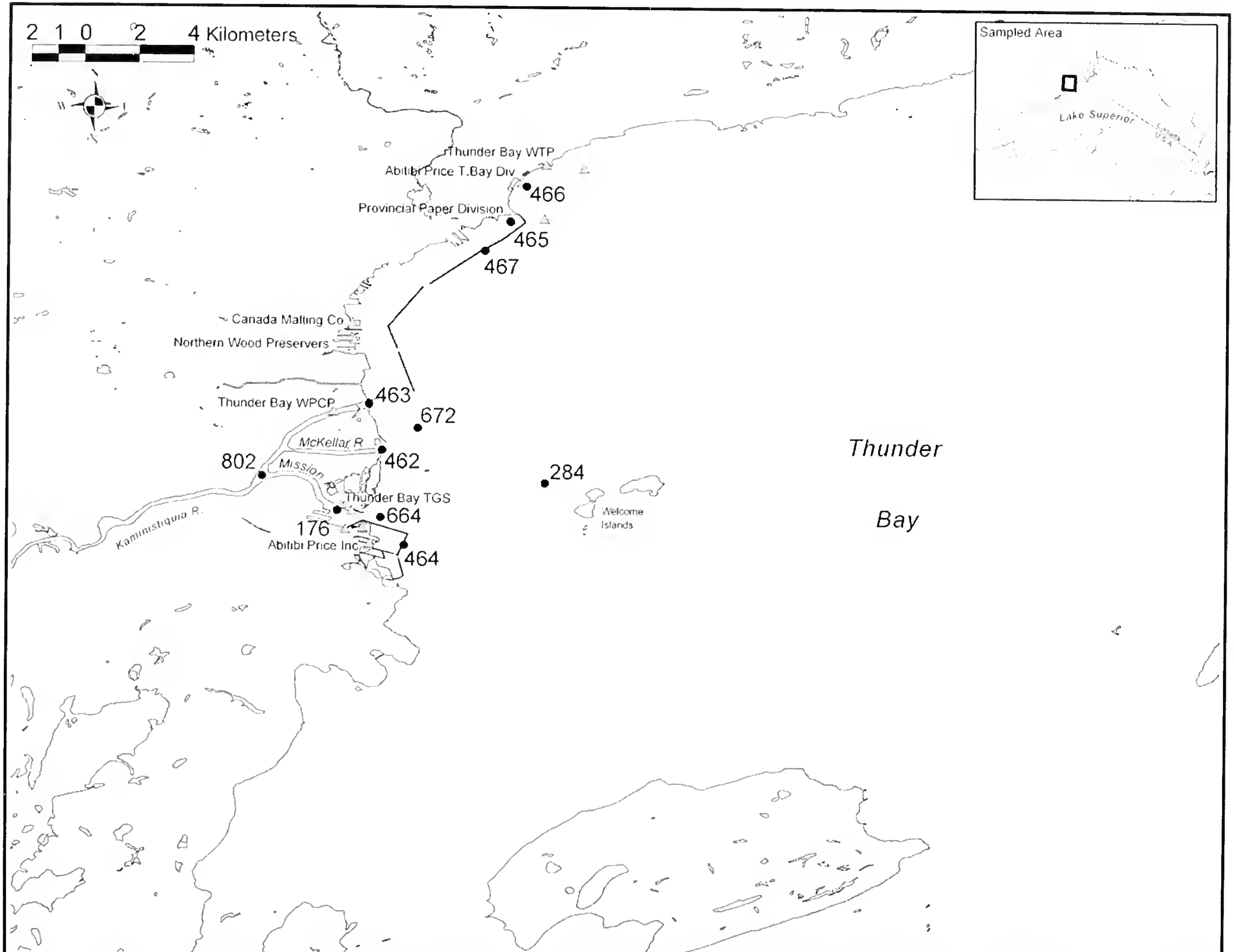

Figure 5: Thunder Bay sediment and water sampling stations, 1999

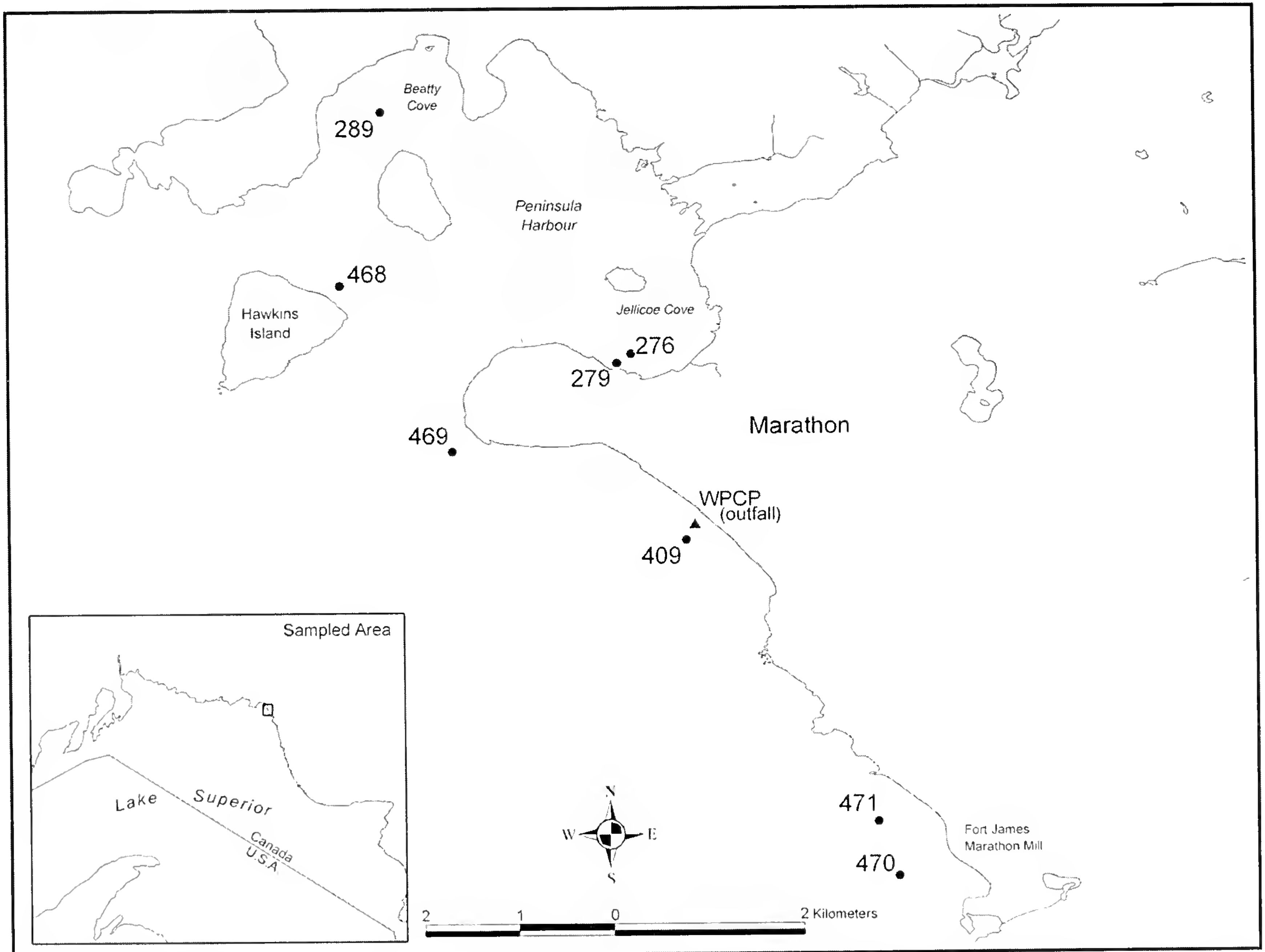

Figure 6: Peninsula Harbour sediment and water sampling stations, 1999

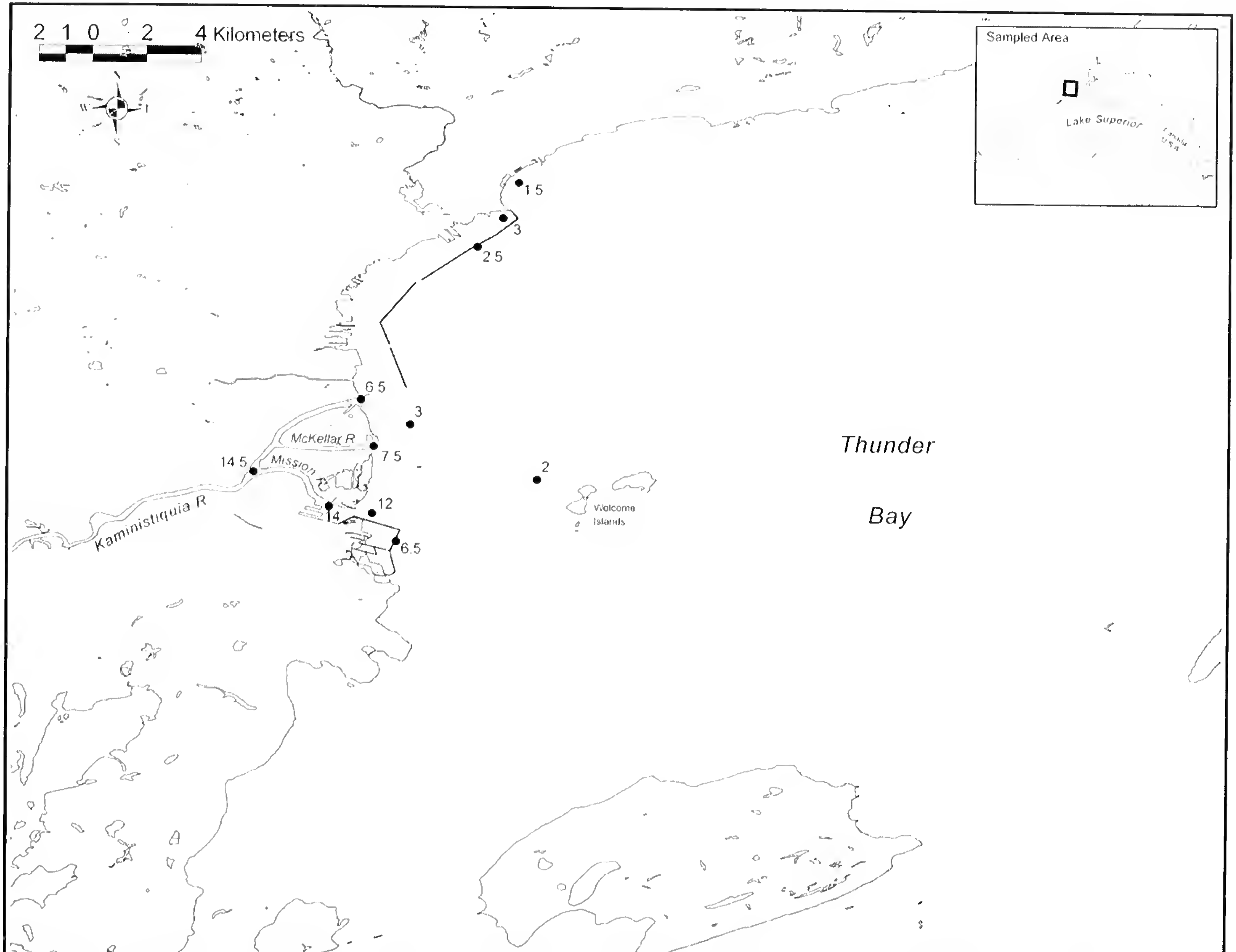

Figure 7: Spring suspended solids concentrations (mg/L), Thunder Bay, 1999

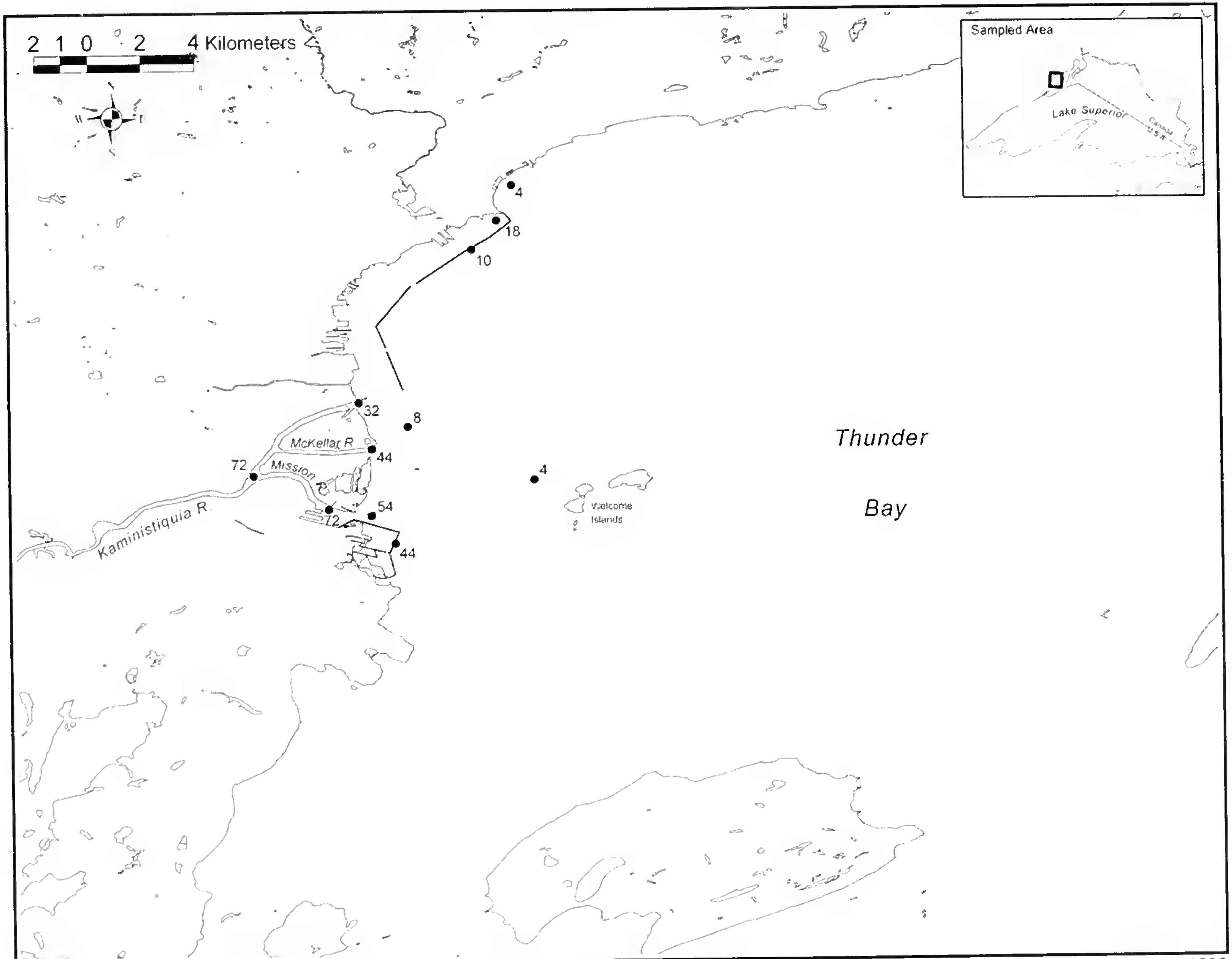

Figure 8: Total phosphorus concentrations (ug/L) in water samples collected in the spring, Thunder Bay, 1999

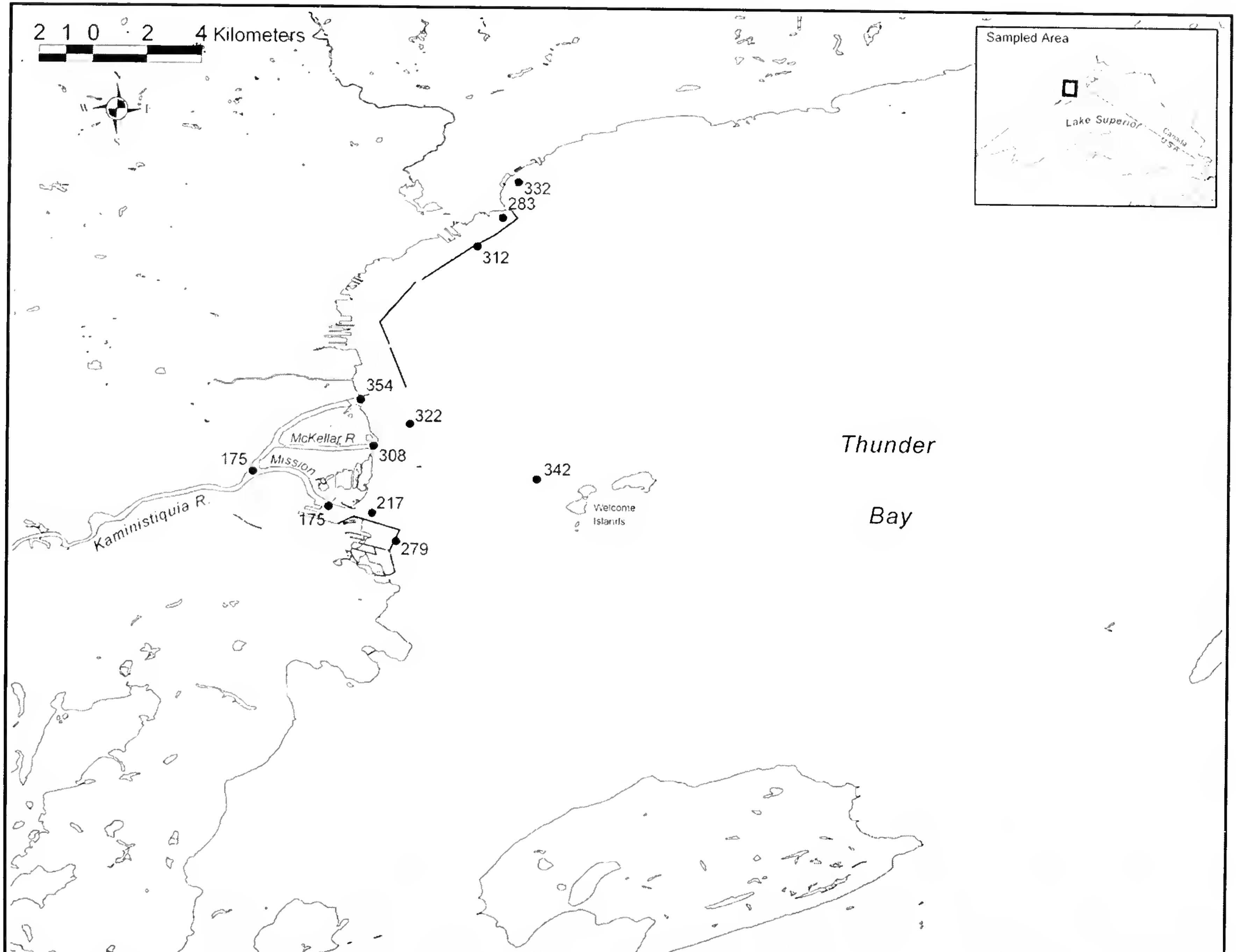

Figure 9: Total inorganic nitrogen concentrations (ug/L) in water samples collected in the spring, 1999

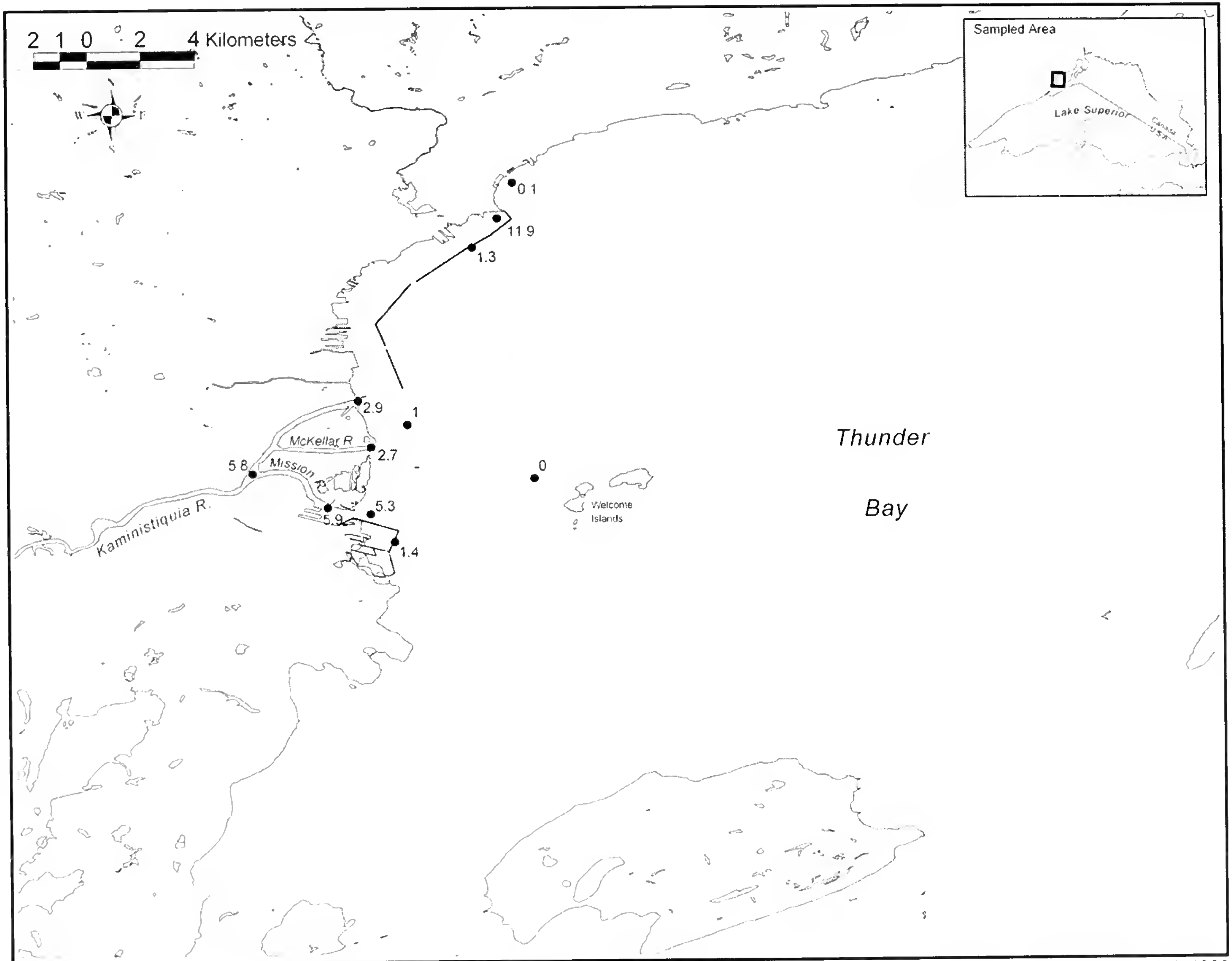

Figure 10: Mercury concentrations (ng/L) in water samples collected in the fall, 1999

Table1: Nutrient concentrations and other water quality parameters for samples collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Sample number		Date YYYYMMDD	Sample Depth (m)	Water Depth (m)	Secchi Depth (m)	*E coli* count/100mL	RMK	Fecal Streptococci count/100mL	RMK	*Pseudomonas aeruginosa* count/100mL	RMK	Chloride mg/L	RMK	Conductivity (field) uS/cm 25 C
Spanish River																		
Spring																		
Mouth of Spanish River	14	1	400	GL979861	11	1999/05/12	1.0	2.2	1.1	4		2		0		10.8		
Whalesback Channel	14	1	401	GL979858	11	1999/05/12	1.5	22.9	2.0	2	<	2	<	0		8.8		
Whalesback Channel (near Greenway Island)	14	1	209	GL979855	11	1999/05/12	1.5	16.0	2.4	2	<	2	<	0		8.4		
Aird Bay	14	1	402	GL979856	14	1999/05/12	1.5	8.0	2.7	2	<	2	<	0		8.6		
Aird Bay	14	1	402	GL979857	14	1999/05/12	1.5	8.0	2.7	2	<	2	<	0		8.4		
Near Shanly Island	14	1	403	GL979859	11	1999/05/12	1.5	11.8	1.8	2	<	2	<	0		8.6		
Near Little Detroit	14	1	404	GL979860	11	1999/05/12	1.5	30.5	6.0	2	<	2	<	0		4.8		
Summer																		
Mouth of Spanish River	14	1	400	GL977455	11	1999/08/10	1.0	2.2	1.0	4		4	<	2	<	20.4		
Whalesback Channel	14	1	401	GL977451	14	1999/08/10	1.5	22.6	3.6	4	<	4	<	2	<	7.2		
Whalesback Channel	14	1	401	GL977452	14	1999/08/10	1.5	22.6	3.6	4	<	4	<	2	<	7.2		
Whalesback Channel (near Greenway Island)	14	1	209	GL977450	11	1999/08/10	1.5	14.9	4.0	4	<	4	<	2	<	7.0		
Aird Bay	14	1	402	GL977453	14	1999/08/10	1.5	8.1	3.8	4	<	4	<	2	<	7.2		
Near Shanly Island	14	1	403	GL977454	11	1999/08/10	1.5	11.9	2.9	4	<	4	<	2	<	9.6		163
Near Little Detroit	14	1	404	GL977456	11	1999/08/10	1.5	32.9	5.9	4	<	4	<	2	<	5.4		
Fall																		
Mouth of Spanish River	14	1	400	GL954053	11	1999/10/20	1.2	2.7	1.2							16.6		
Whalesback Channel	14	1	401	GL954051	11	1999/10/20	1.5	22.8	4.1							8.0		182
Whalesback Channel (near Greenway Island)	14	1	209	GL954050	11	1999/10/20	1.5	13.8	4.0							7.8		
Aird Bay	14	1	402	GL954052	11	1999/10/20	1.5	8.2	2.5							8.0		
Near Shanly Island	14	1	403	GL954048	14	1999/10/20	1.5	11.7	3.0							10.4		
Near Shanly Island	14	1	403	GL954049	14	1999/10/20	1.5	11.7	3.0							10.4		
Near Little Detroit	14	1	404	GL954047	11	1999/10/20	1.5	30.2	6.0							5.4		
Nipigon Bay																		
Spring																		
Downstream of Nipigon R	1	1	458	GL978431	11	1999/05/22	1.5	29.8	1.1							0.2	<=W	
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL978430	11	1999/05/22	0.5	2.2	0.8							2.0		
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL978427	11	1999/05/22	1.5	20.9	1.5							0.8	<T	116
Nipigon Bay - West of Frog Island	1	1	869	GL978425	11	1999/05/22	1.5	30.5	1.5							1.2		
500 m south of mill outfall	1	1	1200	GL978428	14	1999/05/22	1.3	2.8	1.2							2.6		
500 m south of mill outfall	1	1	1200	GL978429	14	1999/05/22	1.3	2.8	1.2							1.8		
Summer																		
Downstream of Nipigon R	1	1	458	GL977420	11	1999/08/01	1.5	29.2	2.5							1.2		
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL977417	14	1999/08/01	1.5	3.0	1.5							1.2		
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL977418	14	1999/08/01	3.0	1.5	1.5							1.4		
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL977416	11	1999/08/01	1.5	21.2	2.4							1.0		
Nipigon Bay - West of Frog Island	1	1	869	GL977415	11	1999/07/31	1.5	3.0	2.1							1.2		
500 m south of mill outfall	1	1	1200	GL977419	11	1999/08/01	1.5	3.0	2.0							1.4		131
Fall																		
Downstream of Nipigon R	1	1	458	GL954015	11	1999/10/11	1.5	28.8	2.6	4	<	4	<	2	<	1.0		
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL954020	11	1999/10/11	0.1	2.1	1.5	4	<	4	<	2	<	1.4		
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL954017	11	1999/10/11	1.5	21.5	1.6	4	<	4	<	2	<	1.2		
Nipigon Bay - West of Frog Island	1	1	869	GL954016	11	1999/10/11	1.5	30.3	1.1	4	<	4	<	2	<	1.2		
500 m south of mill outfall	1	1	1200	GL954018	14	1999/10/11	1.4	0.3	1.1	4	<	4		2	<	1.2		
500 m south of mill outfall	1	1	1200	GL954019	14	1999/10/11	0.0	0.0	1.1	4	<	4	<	2	<	1.4		

Table1: Nutrient concentrations and other water quality parameters for samples collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Sample number		Date YYYYMMDD	Sample Depth (m)	Water Depth (m)	Secchi Depth (m)	*E. coli* count/100mL	RMK	Fecal Streptococci count/100mL	RMK	*Pseudomonas aeruginosa* count/100mL	RMK	Chloride mg/L	RMK	Conductivity (field) uS/cm 25 C
Jackfish Bay																		
Spring																		
Blackbird Creek - mouth	1	1	701	GL978160	11	1999/05/20	0.5	1.6		10	<	80	<=>	4	<			
Blackbird Creek - mouth	1	1	701	GL978421	11	1999/05/20	0.7	1.4	0.2							58.0		469
Moberly Bay	1	1	702	GL978158	14	1999/05/20	0.5	18.8		2		2	<	0				
Moberly Bay	1	1	702	GL978159	14	1999/05/20	0.5	18.8		2	<	2		0				
Moberly Bay	1	1	702	GL978419	14	1999/05/20	1.5	18.8	2.1							7.2		
Moberly Bay	1	1	702	GL978420	14	1999/05/20	1.5	18.8	2.1							8.2		
Downstream of Moberly Bay	1	1	710	GL978157	11	1999/05/20	0.5	27.1		2	<	2	<	0				
Downstream of Moberly Bay	1	1	710	GL978418	11	1999/05/20	1.5	27.8	8.1							1.6		
Jackfish Bay	1	1	451	GL978156	11	1999/05/20	0.5	41.3		2	<	2	<	0				
Jackfish Bay	1	1	451	GL978417	11	1999/05/20	1.5	41.3	6.5							1.4		
Near Terrance Bay at Kimberly Clark	1	1	452	GL978162	11	1999/05/20	0.5	25.0	9.2	2	<	2	<	0				
Near Terrance Bay at Kimberly Clark	1	1	452	GL978423	11	1999/05/20	1.5	27.9	9.2							1.6		
Summer																		
Blackbird Creek - mouth	1	1	701	GL977429	11	1999/08/02	0.8	1.8	0.1	4	<	16		2	<	166.0		
Moberly Bay	1	1	702	GL977428	11	1999/08/02	1.5	18.3	1.5	4	<	24		2	<	13.6		
Downstream of Moberly Bay	1	1	710	GL977427	11	1999/08/02	1.5	34.7	2.5	4		4	<	2	<	4.4		114
Jackfish Bay	1	1	451	GL977426	11	1999/08/02	1.5	40.7	3.0	4	<	4	<	2	<	3.8		
Near Terrance Bay at Kimberly Clark	1	1	452	GL977424	14	1999/08/02	1.5	27.0	9.5	4	<	4	<	2	<	1.4		
Near Terrance Bay at Kimberly Clark	1	1	452	GL977425	14	1999/08/02	1.5	27.0	9.5	4	<	4	<	2	<	1.4		
Fall																		
Blackbird Creek - mouth	1	1	701	GL954028	14	1999/10/13	0.5	2.2	1.0							16.8		
Blackbird Creek - mouth	1	1	701	GL954029	14	1999/10/13	0.5	2.2	1.0							16.8		
Moberly Bay	1	1	702	GL954027	11	1999/10/13	1.5	18.4	2.1							3.6		110
Downstream of Moberly Bay	1	1	710	GL954026	11	1999/10/13	1.5	24.6	7.0							1.6		
Jackfish Bay	1	1	451	GL954025	11	1999/10/13	1.5	41.0	7.5							1.6		
Near Terrance Bay at Kimberly Clark	1	1	452	GL954024	11	1999/10/13	1.5	23.5	8.9							1.6		
Pic River																		
Spring																		
Pic River	1	1	20	GL978148	11	1999/05/19	0.5	11.0		2	<	2	<	0				
Pic River	1	1	20	GL978410	14	1999/05/19	1.5	11.0	5.0							1.0		
Pic River	1	1	20	GL978411	14	1999/05/19	1.5	11.0	5.0							1.0		
Pic River - South of mouth	1	1	454	GL978150	11	1999/05/19	0.5	3.5		2		4		0				
Pic River - South of mouth	1	1	454	GL978413	11	1999/05/19	1.5	3.3	0.8							0.6	<T	
Pic River - west of mouth	1	1	457	GL978149	11	1999/05/19	0.5	1.7		280		720		20	<			
Pic River - west of mouth	1	1	457	GL978412	11	1999/05/19	1.0	2.3	0.0							5.8		158
North of Pic R. by Heron Bay	1	1	21	GL978151	11	1999/05/19	0.5	29.5		2	<	2		0				
North of Pic R. by Heron Bay	1	1	21	GL978414	11	1999/05/19	1.0	29.3	7.5							1.0		
Summer																		
Pic River	1	1	20	GL977444	11	1999/08/05	1.5	11.2	3.0	4	<	4	<	2	<	1.4		
Pic River - mouth	1	1	453	GL977445	14	1999/08/05	1.5	11.6	0.8	4		8		2	<	1.4		
Pic River - mouth	1	1	453	GL977446	14	1999/08/05	1.5	11.6	0.8	4	<	4	<	2	<	2.4		
North of Pic R. by Heron Bay	1	1	21	GL977443	11	1999/08/05	1.5	28.3	9.0	4	<	4	<	2	<	1.6		
Fall																		
Pic River	1	1	20	GL954037	14	1999/10/15	1.5	11.2	8.3							1.4		
Pic River	1	1	20	GL954038	14	1999/10/15	1.5	11.2	8.3							1.4		
Pic River - mouth	1	1	453	GL954039	11	1999/10/15	1.5	13.1	0.5							1.8		
Pic River - South of mouth	1	1	454	GL954040	11	1999/10/15	1.0	2.0	1.0							1.6		
Pic River - west of mouth	1	1	457	GL954041	11	1999/10/15	1.0	2.1	0.6							1.8		
North of Pic R. by Heron Bay	1	1	21	GL954036	11	1999/10/15	1.5	29.5	7.1							1.4		92

<W no measurable response
<T measurable trace amount: interpret with caution
<=> approximate value
14 split sample
11 surface grab sample

Table1: Nutrient concentrations and other water quality parameters for samples collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Sample number		Date YYYY/MM/DD	Ammonia/ ammonium mg/L	RMK	Nitrite mg/L	RMK	Nitrite/Nitrate mg/L	RMK	Total Inorganic Nitrogen	TKN mg/L	RMK	Total Organic Nitrogen	pH (Field)	Total Phosphorus mg/L	RMK	Suspended Solids mg/L	RMK
Spanish River																					
Spring																					
Mouth of Spanish River	14	1	400	GL979861	11	1999/05/12	0.022		0.006		0.180		0.202	0.600		0.578		0.018		3.0	
Whalesback Channel	14	1	401	GL979858	11	1999/05/12	0.016		0.005		0.240		0.256	0.220		0.204		0.008	<T	2.0	<T
Whalesback Channel (near Greenway Island)	14	1	209	GL979855	11	1999/05/12	0.022		0.004	<T	0.255		0.277	0.240		0.218		0.008	<T	2.0	<T
Aird Bay	14	1	402	GL979856	14	1999/05/12	0.018		0.005		0.250		0.268	0.240		0.222		0.008	<T	4.0	
Aird Bay	14	1	402	GL979857	14	1999/05/12	0.018		0.005		0.250		0.268	0.240		0.222		0.008	<T	2.0	<T
Near Shanly Island	14	1	403	GL979859	11	1999/05/12	0.012		0.006		0.240		0.252	0.200		0.188		0.006	<T	2.0	<T
Near Little Detroit	14	1	404	GL979860	11	1999/05/12	0.002	<=W	0.002	<T	0.255		0.257	0.080	<T	0.078		0.002	<=W	1.5	<T
Summer																					
Mouth of Spanish River	14	1	400	GL977455	11	1999/08/10	0.008	<T	0.006		0.075		0.083	0.320		0.312		0.010		11.5	
Whalesback Channel	14	1	401	GL977451	14	1999/08/10	0.008	<T	0.004	<T	0.135		0.143	0.200		0.192		0.008	<T	2.0	<T
Whalesback Channel	14	1	401	GL977452	14	1999/08/10	0.008	<T	0.004	<T	0.140		0.148	0.180		0.172		0.006	<T	2.0	<T
Whalesback Channel (near Greenway Island)	14	1	209	GL977450	11	1999/08/10	0.006	<T	0.004	<T	0.155		0.161	0.200		0.194		0.004	<T	1.5	<T
Aird Bay	14	1	402	GL977453	11	1999/08/10	0.008	<T	0.003	<T	0.125		0.133	0.180		0.172		0.004	<T	2.0	<T
Near Shanly Island	14	1	403	GL977454	11	1999/08/10	0.018		0.003	<T	0.095		0.113	0.200		0.182	7.83	0.016		2.5	
Near Little Detroit	14	1	404	GL977456	11	1999/08/10	0.008	<T	0.002	<T	0.185		0.193	0.120		0.112		0.002	<=W	1.0	<T
Fall																					
Mouth of Spanish River	14	1	400	GL954053	11	1999/10/20	0.036		0.004	<T	0.135		0.171	0.360		0.324		0.024		8.0	
Whalesback Channel	14	1	401	GL954051	11	1999/10/20	0.044		0.009		0.303		0.347	0.220		0.176	7.71	0.012		3.0	
Whalesback Channel (near Greenway Island)	14	1	209	GL954050	11	1999/10/20	0.018		0.001	<=W	0.191		0.209	0.200		0.182		0.012		2.0	<T
Aird Bay	14	1	402	GL954052	11	1999/10/20	0.020		0.001	<=W	0.180		0.200	0.220		0.200		0.008	<T	2.5	
Near Shanly Island	14	1	403	GL954048	14	1999/10/20	0.018		0.001	<=W	0.158		0.176	0.180		0.162		0.012		2.0	<T
Near Shanly Island	14	1	403	GL954049	14	1999/10/20	0.036		0.001	<=W	0.157		0.193	0.240		0.204		0.012		5.0	
Near Little Detroit	14	1	404	GL954047	11	1999/10/20	0.004	<T	0.001	<=W	0.255		0.259	0.280		0.276		0.012		0.5	<T
Nipigon Bay																					
Spring																					
Downstream of Nipigon R	1	1	458	GL978431	11	1999/05/22	0.002	<=W	0.001	<=W	0.085		0.087	0.080	<T	0.078		0.004	<T	7.0	
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL978430	11	1999/05/22	0.012		0.012		0.125		0.137	0.260		0.248		0.040		6.5	
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL978427	11	1999/05/22	0.002	<=W	0.001	<=W	0.210		0.212	0.200		0.198	7.99	0.008	<T	4.0	
Nipigon Bay - West of Frog Island	1	1	869	GL978425	11	1999/05/22	0.002	<=W	0.001	<=W	0.260		0.262	0.200		0.198		0.008	<T	5.5	
500 m south of mill outfall	1	1	1200	GL978428	14	1999/05/22	0.004	<T	0.010		0.185		0.189	0.300		0.296		0.032		5.5	
500 m south of mill outfall	1	1	1200	GL978429	14	1999/05/22	0.004	<T	0.007		0.185		0.189	0.260		0.256		0.024		5.5	
Summer																					
Downstream of Nipigon R	1	1	458	GL977420	11	1999/08/01	0.002	<=W	0.003	<T	0.120		0.122	0.200		0.198		0.004	<T	3.0	
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL977417	14	1999/08/01	0.002	<=W	0.003	<T	0.070		0.072	0.220		0.218		0.010		5.0	
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL977418	14	1999/08/01	0.002	<=W	0.003	<T	0.070		0.072	0.220		0.218		0.012		5.0	
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL977416	11	1999/08/01	0.002	<=W	0.002	<T	0.100		0.102	0.180		0.178		0.006	<T	2.5	<T
Nipigon Bay - West of Frog Island	1	1	869	GL977415	11	1999/07/31	0.002	<=W	0.003	<T	0.120		0.122	0.160		0.158		0.004	<T	2.5	
500 m south of mill outfall	1	1	1200	GL977419	11	1999/08/01	0.002	<=W	0.003	<T	0.105		0.107	0.240		0.238	8.01	0.008	<T	2.5	
Fall																					
Downstream of Nipigon R	1	1	458	GL954015	11	1999/10/11	0.004	<T	0.002	<T	0.047		0.051	0.180		0.176		0.006	<T	3.0	
Nipigon Bay - 30 m S of mill outfall	1	1	458	GL954020	11	1999/10/11	0.004	<T	0.001	<=W	0.138		0.142	0.180		0.176		0.008	<T	4.5	
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL954017	11	1999/10/11	0.008	<T	0.003	<T	0.160		0.168	0.160		0.152		0.006	<T	4.5	
Nipigon Bay - West of Frog Island	1	1	869	GL954016	11	1999/10/11	0.008	<T	0.004	<T	0.193		0.201	0.180		0.172		0.020		4.0	
500 m south of mill outfall	1	1	1200	GL954018	14	1999/10/11	0.004	<T	0.002	<T	0.147		0.151	0.180		0.176		0.008	<T	3.5	
500 m south of mill outfall	1	1	1200	GL954019	14	1999/10/11	0.006	<T	0.002	<T	0.148		0.154	0.200		0.194		0.012		4.0	

Table1: Nutrient concentrations and other water quality parameters for samples collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Sample number		Date YYYYMMDD	Ammonia/ ammonium mg/L	RMK	Nitrite mg/L	RMK	Nitrite/Nitrate mg/L	RMK	Total Inorganic Nitrogen	TKN mg/L	RMK	Total Organic Nitrogen	pH (Field)	Total Phosphorus mg/L	RMK	Suspended Solids mg/L	RMK
Jackfish Bay																					
Spring																					
Blackbird Creek - mouth	1	1	701	GL978160	11	1999/05/20															
Blackbird Creek - mouth	1	1	701	GL978421	11	1999/05/20	0.222		0.099		0.610		1.032	1.040		0.818	7.51	0.144		9.0	
Moberly Bay	1	1	702	GL978158	14	1999/05/20															
Moberly Bay	1	1	702	GL978159	14	1999/05/20															
Moberly Bay	1	1	702	GL978419	14	1999/05/20	0.034		0.010		0.375		0.409	0.240		0.206		0.016		1.5	<T
Moberly Bay	1	1	702	GL978420	14	1999/05/20	0.040		0.012		0.385		0.425	0.280		0.240		0.018		1.5	<T
Downstream of Moberly Bay	1	1	710	GL978157	11	1999/05/20															
Downstream of Moberly Bay	1	1	710	GL978418	11	1999/05/20	0.002	<=W	0.001	<=W	0.355		0.357	0.140		0.138		0.004	<T	3.5	
Jackfish Bay	1	1	451	GL978158	11	1999/05/20															
Jackfish Bay	1	1	451	GL978417	11	1999/05/20	0.002	<=W	0.001	<=W	0.350		0.352	0.120		0.118		0.004	<T	0.5	<T
Near Terrance Bay at Kimberly Clark	1	1	452	GL978162	11	1999/05/20															
Near Terrance Bay at Kimberly Clark	1	1	452	GL978423	11	1999/05/20	0.002	<=W	0.001	<=W	0.345		0.347	0.080	<T	0.078		0.002	<=W	1.0	<T
Summer																					
Blackbird Creek - mouth	1	1	701	GL977429	11	1999/08/02	1.160		0.236		0.485		1.645	3.040		1.880		0.440		8.0	
Moberly Bay	1	1	702	GL977428	11	1999/08/02	0.098		0.018		0.335		0.433	0.340		0.242		0.032		0.5	<T
Downstream of Moberly Bay	1	1	710	GL977427	11	1999/08/02	0.024		0.006		0.315		0.339	0.180		0.156	7.85	0.012		0.5	<W
Jackfish Bay	1	1	451	GL977426	11	1999/08/02	0.018		0.006		0.320		0.338	0.160		0.144		0.012		1.0	<T
Near Terrance Bay at Kimberly Clark	1	1	452	GL977424	14	1999/08/02	0.002	<=W	0.003	<T	0.310		0.312	0.100		0.098		0.006	<T	0.5	<T
Near Terrance Bay at Kimberly Clark	1	1	452	GL977425	14	1999/08/02	0.004	<T	0.003	<T	0.310		0.314	0.080	<T	0.076		0.004	<T	0.5	<T
Fall																					
Blackbird Creek - mouth	1	1	701	GL954028	14	1999/10/13	0.056		0.017		0.384		0.440	0.360		0.304		0.026		3.0	
Blackbird Creek - mouth	1	1	701	GL954029	14	1999/10/13	0.102		0.032		0.423		0.525	0.380		0.278		0.028		4.0	
Moberly Bay	1	1	702	GL954027	11	1999/10/13	0.016		0.008		0.340		0.358	0.200		0.184	7.18	0.012		3.0	
Downstream of Moberly Bay	1	1	710	GL954026	11	1999/10/13	0.004	<T	0.003	<T	0.326		0.330	0.120		0.116		0.008	<T	1.0	<T
Jackfish Bay	1	1	451	GL954025	11	1999/10/13	0.002	<=W	0.003	<T	0.328		0.330	0.120		0.118		0.006	<T	0.5	<T
Near Terrance Bay at Kimberly Clark	1	1	452	GL954024	11	1999/10/13	0.008	<T	0.003	<T	0.335		0.343	0.120		0.112		0.008	<T	0.5	<T
Pic River																					
Spring																					
Pic River	1	1	20	GL978148	11	1999/05/19															
Pic River	1	1	20	GL978410	14	1999/05/19	0.002	<=W	0.001	<=W	0.345		0.347	0.120		0.118		0.004	<T	1.0	<T
Pic River	1	1	20	GL978411	14	1999/05/19	0.002	<=W	0.001	<=W	0.345		0.347	0.140		0.138		0.004	<T	1.0	<T
Pic River - South of mouth	1	1	454	GL978150	11	1999/05/19															
Pic River - South of mouth	1	1	454	GL978413	11	1999/05/19	0.002	<=W	0.003	<T	0.350		0.352	0.180		0.158		0.012		7.5	
Pic River - west of mouth	1	1	457	GL978149	11	1999/05/19															
Pic River - west of mouth	1	1	457	GL978412	11	1999/05/19	0.002	<=W	0.143		0.760		0.762	2.400		2.398	7.96	1.220		3520.0	
North of Pic R. by Heron Bay	1	1	21	GL978151	11	1999/05/19															
North of Pic R. by Heron Bay	1	1	21	GL978414	11	1999/05/19	0.002	<=W	0.001	<=W	0.345		0.347	0.080	<T	0.078		0.002	<=W	1.0	<T
Summer																					
Pic River	1	1	20	GL977444	11	1999/08/05	0.007	<=W	0.007		0.290		0.292	0.140		0.138		0.010		2.0	<T
Pic River - mouth	1	1	453	GL977445	14	1999/08/05	0.002	<=W	0.004	<T	0.070		0.072	0.400		0.398		0.016		9.5	
Pic River - mouth	1	1	453	GL977446	14	1999/08/05	0.002	<=W	0.007		0.070		0.072	0.420		0.418		0.020		9.5	
North of Pic R. by Heron Bay	1	1	21	GL977443	11	1999/08/05	0.002	<=W	0.001	<=W	0.305		0.307	0.080	<T	0.078		0.004	<T	0.5	<T
Fall																					
Pic River	1	1	20	GL954037	14	1999/10/15	0.012		0.003	<T	0.320		0.332	0.080	<T	0.068		0.008	<T	0.5	<W
Pic River	1	1	20	GL954038	14	1999/10/15	0.012		0.003	<T	0.322		0.334	0.120		0.108		0.012		1.0	<T
Pic River - mouth	1	1	453	GL954039	11	1999/10/15	0.016		0.005		0.123		0.139	0.480		0.464		0.020		14.5	
Pic River - South of mouth	1	1	454	GL954040	11	1999/10/15	0.016		0.005		0.210		0.226	0.440		0.424		0.016		8.0	
Pic River - west of mouth	1	1	457	GL954041	11	1999/10/15	0.014		0.005		0.132		0.146	0.520		0.506		0.020		14.0	
North of Pic R. by Heron Bay	1	1	21	GL954036	11	1999/10/15	0.008	<T	0.003	<T	0.318		0.326	0.080	<T	0.072	7.29	0.002	<=W	1.0	<T

<W no measurable response
<T measurable trace amount, interpret with caution
<=> approximate value
14 - split sample
11 - surface grab sample

Table 1. Nutrient concentrations and other water quality parameters for samples collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Number	Sample Type	Date YYYYMMDD	Sample Depth (m)	Water Depth (m)	Secchi Depth (m)	*E. coli* count/100mL	RMK	Fecal Strep count/100mL	RMK	*Pseudomonas aeruginosa* count/100mL	RMK	Chloride mg/L	Conductivity UMHO/CM
Thunder Bay																	
Spring																	
Kam R. at Mission River	1	1	802	GL978437	14	1999/05/25	1.5	7.5	0.5	240		32		4		8.4	
Kam R. at Mission River	1	1	802	GL978438	14	1999/05/25	1.5	7.5	0.5	232		92		2		8.4	
Kam River - mouth	1	1	463	GL978436	11	1999/05/25	1.5	8.7	0.8	48		56		2	<	10.6	
Mission River - mouth	1	1	176	GL978439	11	1999/05/25	1.5	7.8	0.4	180		72		4		8.4	142
McKellar River - mouth	1	1	462	GL978442	11	1999/05/26	1.5	3.4	0.6	36		12		2	<	8.0	
Mission River transect	1	1	664	GL978441	11	1999/05/26	1.2	2.4	0.4	180	<=>	36		6		6.8	
Between McKellar & Kam River	1	1	672	GL978435	11	1999/05/25	1.5	3.9	1.9	2		4		0		1.8	
North of Mission Bay Disposal	1	1	464	GL978440	11	1999/05/26	1.5	9.2		32		12		2		5.9	
Provincial Paper (outside filtration bed)	1	1	465	GL978445	11	1999/05/26	0.5	0.9	B	4	<	12		2	<	2.4	
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL978443	11	1999/05/26	1.1	2.2		4	<	4		2	<	1.8	
North Entrance	1	1	467	GL978444	11	1999/05/26	1.5	10.9	B	8		6		2	<	2.0	
Summer																	
Kam R. at Mission River	1	1	802	GL977404	11	1999/07/29	1.5	8.0	0.9	48		28		2		5.6	
Kam River - mouth	1	1	463	GL977408	11	1999/07/29	1.5	9.2	1.0	24		44		2	<	5.0	
Mission River - mouth	1	1	176	GL977405	11	1999/07/29	1.5	6.1	1.1	32		72		2		6.4	
McKellar River - mouth	1	1	462	GL977406	11	1999/07/29	1.5	4.1	1.6	12		32		2	<	4.6	
Mission River transect	1	1	664	GL977402	14	1999/07/29	1.2	2.6	1.3	48		76		6		2.0	
Mission River transect	1	1	664	GL977403	14	1999/07/29	1.2	2.6	1.3	52		64		2	<	2.6	
Between McKellar & Kam River	1	1	672	GL977407	11	1999/07/29	1.5	4.2	2.3	4	<	8		2	<	3.0	
North of Mission Bay Disposal	1	1	464	GL977401	11	1999/07/29	1.5	6.3	1.8	220		4	<	2	<	1.8	
Provincial Paper (outside filtration bed)	1	1	465	GL977411	11	1999/07/29	1.1	2.3	1.4	4	<	12		2	<	2.6	
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL977409	11	1999/07/29	1.1	2.7	B	4		4	<	6		1.6	
North Entrance	1	1	467	GL977410	11	1999/07/29	1.5	10.9	2.2	4	<	6		2	<	2.0	
Fall																	
Kam R. at Mission River	1	1	802	GL954005	11	1999/10/10	1.5	6.0	0.5							6.8	132
Kam River - mouth	1	1	463	GL954008	11	1999/10/10	1.5	9.1	1.0							9.6	148
Mission River - mouth	1	1	176	GL954004	11	1999/10/10	1.5	6.2	0.4							7.0	132
McKellar River - mouth	1	1	462	GL954006	11	1999/10/10	1.5	3.9	0.8							6.4	124
Mission River transect	1	1	664	GL954002	14	1999/10/10	1.2	2.6	0.3							7.0	126
Mission River transect	1	1	664	GL954003	14	1999/10/10	1.2	2.6	0.3							6.6	126
Between McKellar & Kam River	1	1	672	GL954007	11	1999/10/10	1.5	4.0	3.0							2.8	107
North of Mission Bay Disposal	1	1	464	GL954001	11	1999/10/10	1.5	6.3	1.2							3.2	109
Provincial Paper (outside filtration bed)	1	1	465	GL954011	11	1999/10/10	1.1	2.2	1.9							2.2	112
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL954009	11	1999/10/10	1.3	2.7	B							1.6	98
North Entrance	1	1	467	GL954010	11	1999/10/10	1.5	10.7	3.7							1.8	101
Peninsula Harbour																	
Spring																	
Jellicoe Cove - Near wharf	1	1	276	GL978401	11	1999/05/17	1.5		B							1.4	
Jellicoe Cove - Near wharf	1	1	276	GL978142	14	1999/05/19	0.5	4.9		2	<	4		0			
Jellicoe Cove - Near wharf	1	1	279	GL978141	11	1999/05/19	0.5	4.0		10		16		1			
Jellicoe Cove - Near wharf	1	1	276	GL978143	14	1999/05/19	0.5	4.9		2		4		0			
Jellicoe Cove - Near wharf	1	1	279	GL978402	14	1999/05/17	1.5	2.9	B							1.6	99
Jellicoe Cove - Near wharf	1	1	279	GL978403	14	1999/05/17	1.5	2.9	B							1.6	
Marathon Bay - New mill Discharge pt	1	1	470	GL978404	11	1999/05/17	1.5	4.4	B							1.6	
Marathon Bay - New mill Discharge pt	1	1	470	GL978147	11	1999/05/19	0.5	5.0		2	<	2	<	0			
Upstream - new mill discharge pt	1	1	471	GL978405	11	1999/05/17	1.5	9.0	6.6							2.2	
Upstream - new mill discharge pt	1	1	471	GL978148	11	1999/05/19	0.5	9.0		2		2	<	0			
500 m south of STP	1	1	409	GL978409	11	1999/05/19	1.5	110.0	5.0							0.8	
Summer																	
Jellicoe Cove - Near wharf	1	1	276	GL977437	14	1999/08/04	1.5	6.7	B	8		4	<	2	<	1.6	
Jellicoe Cove - Near wharf	1	1	276	GL977438	14	1999/08/04	1.5	6.7	B	4	<	4		2	<	1.6	
Jellicoe Cove - Near wharf	1	1	279	GL977439	11	1999/08/04	1.5	3.1	B	4		4		2	<	1.6	
Marathon Bay - New mill Discharge pt	1	1	470	GL977433	11	1999/08/04	1.5	4.4	B	4	<	4	<	2	<	2.0	
Upstream - new mill discharge pt	1	1	471	GL977434	11	1999/08/04	1.5	0.9	0.4	4	<	4	<	2	<	1.6	
500 m south of STP	1	1	409	GL977435	11	1999/08/04	1.5	48.0								1.4	
Fall																	
Jellicoe Cove - Near wharf	1	1	276	GL954042	11	1999/10/15	1.5	6.5	B							1.4	93
Jellicoe Cove - Near wharf	1	1	279	GL954043	14	1999/10/15	1.5	3.2	B							1.4	
Jellicoe Cove - Near wharf	1	1	279	GL954044	14	1999/10/15	1.5	3.2	B							1.4	
Marathon Bay - New mill Discharge pt	1	1	470	GL954035	11	1999/10/15	1.5	4.3	B							2.4	
Upstream - new mill discharge pt	1	1	471	GL954034	11	1999/10/15	1.5	8.6	6.6							2.0	
500 m south of STP	1	1	409	GL954033	11	1999/10/15	1.5	48.0								1.6	

<W no measurable response
<T measurable trace amount interpret with caution
<=> approximate value
NDIS - insufficient sample
14 split sample
11 surface grab sample

Table 1: Nutrient concentrations and other water quality parameters for samples collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Number	Ammonia/ ammonium mg/L	RMK	Nitrite mg/L	RMK	Nitrite/Nitrate mg/L	RMK	Total Inorganic Nitrogen	TKN mg/L	RMK	Total Organic Nitrogen	Phosphate mg/L	RMK	Total Phosphorus mg/L	RMK	Suspended Solids mg/L	RMK	Phenol ug/L	RMK
Thunder Bay																						
Spring																						
Kam R. at Mission River	1	1	602	GL978437	0.068		0.010		0.105		0.173	0.680		0.612	0.043		0.072		14.0			
Kam R. at Mission River	1	1	602	GL978438	0.070		0.012		0.105		0.175	0.680		0.590	0.044		0.072		14.5			
Kam River - mouth	1	1	463	GL978436	0.084		0.008		0.270		0.354	0.520		0.436	0.006		0.032		6.5			
Mission River - mouth	1	1	176	GL978439	0.070		0.011		0.105		0.175	0.680		0.610	0.042		0.072		14.0		0.8	<T
McKellar River - mouth	1	1	462	GL978442	0.078		0.008		0.230		0.308	0.520		0.442	0.016		0.044		7.5			
Mission River transect	1	1	664	GL978441	0.052		0.009		0.165		0.217	0.520		0.468	0.023		0.054		12.0			
Between McKellar & Kam River	1	1	672	GL978435	0.002	<=W	0.001	<=W	0.320		0.322	0.160		0.158	0.002	<T	0.008	<T	3.0			
North of Mission Bay Disposal	1	1	464	GL978440	0.014		0.008		0.265		0.279	0.400		0.386	0.014		0.044		6.5			
Provincial Paper (outside filtration bed)	1	1	465	GL978445	0.008	<T	0.004	<T	0.275		0.283	0.320		0.312	0.002	<T	0.018		3.0			
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL978443	0.002	<=W	0.002	<T	0.330		0.332	0.120		0.118	0.001	<T	0.004	<T	1.5	<T		
North Entrance	1	1	467	GL978444	0.002	<=W	0.003	<T	0.310		0.312	0.240		0.238	0.001	<T	0.010		2.5	<T		
Summer																						
Kam R. at Mission River	1	1	602	GL977404	0.114		0.006		0.205		0.319	0.560		0.446	0.036		0.068		4.0			
Kam River - mouth	1	1	463	GL977408	0.212		0.007		0.255		0.467	0.400		0.166	0.017		0.020		3.0			
Mission River - mouth	1	1	176	GL977405	0.062		0.006		0.230		0.292	0.420		0.358	0.025		0.046		4.5			
McKellar River - mouth	1	1	462	GL977406	0.066		0.005		0.240		0.306	0.380		0.314	0.012		0.032		3.0			
Mission River transect	1	1	664	GL977402	0.002	<=W	0.003	<T	0.310		0.312	0.200		0.198	0.002	<T	0.018		3.5			
Mission River transect	1	1	864	GL977403	0.002	<=W	0.003	<T	0.295		0.297	NDIS			0.002	<T	NDIS		3.5			
Between McKellar & Kam River	1	1	672	GL977407	0.050		0.004	<T	0.300		0.350	0.300		0.250	0.008		0.022		3.0			
North of Mission Bay Disposal	1	1	464	GL977401	0.002	<=W	0.002	<T	0.310		0.312	0.140		0.138	0.002	<T	0.008	<T	3.0			
Provincial Paper (outside filtration bed)	1	1	465	GL977411	0.126		0.005		0.195		0.321	0.320		0.194	0.008		0.024		5.5			
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL977409	0.008	<T	0.003	<T	0.290		0.298	0.160		0.152	0.002	<T	0.004	<T	2.0	<T		
North Entrance	1	1	467	GL977410	0.016		0.003	<T	0.265		0.281	0.240		0.224	0.001	<T	0.010		3.0			
Fall																						
Kam R. at Mission River	1	1	602	GL954005	0.006	<T	0.008		0.169		0.177	0.600		0.592	0.034		0.048		11.0			
Kam River - mouth	1	1	463	GL954008	0.440		0.007		0.253		0.693	0.980		0.540	0.021		0.054		4.5		0.8	<T
Mission River - mouth	1	1	176	GL954004	0.008	<T	0.008		0.176		0.184	0.640		0.632	0.036		0.046		12.5		0.4	<T
McKellar River - mouth	1	1	462	GL954008	0.192		0.008		0.247		0.439	0.640		0.448	0.028		0.046		3.0		0.6	<T
Mission River transect	1	1	664	GL954002	0.016		0.008		0.178		0.194	0.560		0.544	0.045		0.048		10.5		0.6	<T
Mission River transect	1	1	664	GL954003	0.016		0.008		0.179		0.195	0.680		0.664	0.033		0.054		10.0		0.4	<T
Between McKellar & Kam River	1	1	672	GL954007	0.092		0.003	<T	0.326		0.418	0.280		0.188	0.006		0.012		1.5	<T	0.4	<T
North of Mission Bay Disposal	1	1	464	GL954001	0.014		0.003	<T	0.299		0.313	0.300		0.286	0.011		0.024		4.0		0.6	<T
Provincial Paper (outside filtration bed)	1	1	465	GL954011	0.044		0.002	<T	0.306		0.350	0.240		0.196	0.008		0.024		3.5		0.4	<T
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL954009	0.004	<T	0.002	<T	0.328		0.332	0.120		0.116	0.004		0.004	<T	1.0	<T	0.2	<=W
North Entrance	1	1	467	GL954010	0.012		0.002	<T	0.322		0.334	0.200		0.188	0.007		0.016		2.0	<T	0.4	<T
Peninsula Harbour																						
Spring																						
Jellicoe Cove - Near wharf	1	1	276	GL978401	0.002	<=W	0.001	<=W	0.350		0.352	0.080	<T	0.078	0.001	<=W	0.004	<T	0.5	<T		
Jellicoe Cove - Near wharf	1	1	276	GL978142																		
Jellicoe Cove - Near wharf	1	1	279	GL978141																		
Jellicoe Cove - Near wharf	1	1	276	GL978143																		
Jellicoe Cove - Near wharf	1	1	279	GL978402	0.002	<=W	0.001	<=W	0.350		0.352	0.080	<T	0.078	0.001	<T	0.002	<=W	1.0	<T	0.2	<=W
Jellicoe Cove - Near wharf	1	1	278	GL978403	0.002	<=W	0.001	<=W	0.350		0.352	0.100		0.098	0.001	<=W	0.002	<=W	1.0	<T		
Marathon Bay - New mill Discharge pt	1	1	470	GL978404	0.002	<=W	0.001	<=W	0.345		0.347	0.100		0.098	0.001	<T	0.002	<=W	1.0	<T		
Marathon Bay - New mill Discharge pt	1	1	470	GL978147																		
Upstream - new mill discharge pt	1	1	471	GL978405	0.002	<=W	0.002	<T	0.350		0.352	0.200		0.198	0.001	<T	0.004	<T	0.5	<W		
Upstream - new mill discharge pt	1	1	471	GL978146																		
500 m south of STP	1	1	409	GL978409	0.002	<=W	0.001	<=W	0.35		0.352	0.120		0.118			0.004	<T	0.5	<T		
Summer																						
Jellicoe Cove - Near wharf	1	1	276	GL977437	0.002	<=W	0.004	<T	0.305		0.307	0.100		0.098	0.002	<T	0.004	<T	0.5	<T		
Jellicoe Cove - Near wharf	1	1	276	GL977438	0.002	<=W	0.004	<T	0.300		0.302	0.080	<T	0.078	0.001	<=W	0.004	<T	1.0	<T		
Jellicoe Cove - Near wharf	1	1	279	GL977439	0.002	<=W	0.004	<T	0.310		0.312	0.120		0.118	0.001	<=W	0.004	<T	1.0	<T		
Marathon Bay - New mill Discharge pt	1	1	470	GL977433	0.006	<T	0.005		0.295		0.301	0.020	<=W	0.014	0.001	<=W	0.002	<=W	1.0	<T		
Upstream - new mill discharge pt	1	1	471	GL977434	0.002	<=W	0.002	<T	0.295		0.297	0.080	<T	0.078	0.001	<=W	0.004	<T	1.5	<T		
500 m south of STP	1	1	409	GL977435	0.004	<T	0.002	<T	0.300		0.304	0.060	<T	0.056			0.002	<=W	1	<T		
Fall																						
Jellicoe Cove - Near wharf	1	1	276	GL954042	0.010		0.004	<T	0.309		0.319	0.100		0.090	0.003		0.004	<T	0.5	<T	0.2	<=W
Jellicoe Cove - Near wharf	1	1	279	GL954043	0.008	<T	0.003	<T	0.311		0.319	0.100		0.092	0.002	<T	0.004	<T	1.0	<T		
Jellicoe Cove - Near wharf	1	1	279	GL954044	0.006	<T	0.003	<T	0.309		0.315	0.160		0.154	0.002	<T	0.012		0.5	<T		
Marathon Bay - New mill Discharge pt	1	1	470	GL954035	0.012		0.003	<T	0.315		0.327	0.160		0.148	0.001	<T	0.010		2.0	<T		
Upstream - new mill discharge pt	1	1	471	GL954034	0.008	<T	0.002	<T	0.321		0.329	0.140		0.132	0.001	<T	0.012		1.5	<T		
500 m south of STP	1	1	409	GL954033	0.008	<T	0.003	<T	0.318		0.324	0.120		0.112			0.004	<T	1	<T		

<W no measurable response
<T measurable trace amount interpret with caution
<=> approximate value
NDIS insufficient sample
14 split sample
11 surface grab sample

Table 2: Metal concentrations in water collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Sample number		Date YYYYMMDD	Aluminum ug/L		Arsenic ug/L		Barium ug/L		Beryllium ug/L		Cadmium ug/L		Cobalt ug/L		Chromium ug/L	
Spanish River																				
Spring																				
Mouth of Spanish River	14	1	400	GL979861	11	1999/05/12	51.8	+/- 11.000	0.0005	<=W	14.6	+/- 0.940	-0.002	+/- 1.000	0.032	+/- 0.500	0.303	+/- 1.000	1.86	+/- 5.000
Whalesback Channel	14	1	401	GL979858	11	1999/05/12	32.4	+/- 11.000	0.0005	<=W	12.3	+/- 0.930	-0.020	+/- 1.000	0.061	+/- 0.500	0.206	+/- 1.000	1.79	+/- 5.000
Whalesback Channel (near Greenway Island)	14	1	209	GL979855	11	1999/05/12	31.0	+/- 11.000	0.0005	<=W	12.3	+/- 0.930	0.009	+/- 1.000	0.007	+/- 0.500	0.195	+/- 1.000	1.85	+/- 5.000
Aird Bay	14	1	402	GL979856	14	1999/05/12	31.2	+/- 10.000	0.0005	<=W	12.2	+/- 0.980	-0.032	+/- 1.000	0.044	+/- 0.500	0.191	+/- 1.000	1.56	+/- 5.000
Aird Bay	14	1	402	GL979857	14	1999/05/12	32.2	+/- 11.000	0.0005	<=W	12.5	+/- 1.100	0.035	+/- 1.000	0.054	+/- 0.500	0.183	+/- 1.000	1.50	+/- 5.000
Near Shanly Island	14	1	403	GL979859	11	1999/05/12	31.9	+/- 11.000	0.0005	<=W	12.4	+/- 0.820	0.014	+/- 1.000	0.012	+/- 0.500	0.185	+/- 1.000	1.85	+/- 5.000
Near Little Detroit	14	1	404	GL979860	11	1999/05/12	5.9	+/- 10.000	0.0005	<=W	12.4	+/- 0.800	0.001	+/- 1.000	-0.004	+/- 0.510	0.046	+/- 1.000	4.18	+/- 5.000
Summer																				
Mouth of Spanish River	14	1	400	GL977455	11	1999/08/10	52.0	+/-7	0.0005	<=W	20.3	+/-2.51	0.000	+/-0.1	0.040	+/-0.05	0.200	+/-0.1	0.40	+/-0.5
Whalesback Channel	14	1	401	GL977451	14	1999/08/10	8.0	+/-1	0.0005	<=W	11.8	+/-1.15	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	1.30	+/-0.5
Whalesback Channel	14	1	401	GL977452	14	1999/08/10	10.0	+/-2	0.0005	<=W	12.2	+/-1.14	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	0.30	+/-0.5
Whalesback Channel (near Greenway Island)	14	1	209	GL977450	11	1999/08/10	6.0	+/-1	0.0005	<=W	12.1	+/-1.53	0.000	+/-0.1	0.020	+/-0.05	0.100	+/-0.1	1.50	+/-0.5
Aird Bay	14	1	402	GL977453	11	1999/08/10	9.0	+/-1	0.0005	<=W	11.8	+/-0.6	-0.100	+/-0.1	0.020	+/-0.05	0.100	+/-0.1	0.30	+/-0.5
Near Shanly Island	14	1	403	GL977454	11	1999/08/10	14.0	+/-1	0.0005	<=W	13.2	+/-1.57	-0.100	+/-0.1	0.020	+/-0.05	0.100	+/-0.1	0.30	+/-0.5
Near Little Detroit	14	1	404	GL977456	11	1999/08/10	6.0	+/-1	0.0005	<=W	12.4	+/-0.82	-0.100	+/-0.1	0.010	+/-0.05	0.000	+/-0.1	0.30	+/-0.5
Fall																				
Mouth of Spanish River	14	1	400	GL954053	11	1999/10/20	79.0	+/-5	0.0005	<=W	16.3	+/-1.23	-0.200	+/-0.5	0.020	+/-0.05	0.300	+/-0.1	0.40	+/-0.5
Whalesback Channel	14	1	401	GL954051	11	1999/10/20	10.0	+/-2	0.0005	<=W	13.1	+/-0.93	-0.200	+/-0.5	0.000	+/-0.05	0.100	+/-0.1	0.30	+/-0.5
Whalesback Channel (near Greenway Island)	14	1	209	GL954050	11	1999/10/20	10.0	+/-1	0.0005	<=W	13.0	+/-0.76	-0.200	+/-0.5	0.000	+/-0.05	0.100	+/-0.1	0.30	+/-0.5
Aird Bay	14	1	402	GL954052	11	1999/10/20	24.0	+/-2	0.0005	<=W	13.4	+/-0.71	-0.300	+/-0.5	0.000	+/-0.05	0.100	+/-0.1	0.40	+/-0.5
Near Shanly Island	14	1	403	GL954048	14	1999/10/20	47.0	+/-6	0.0005	<=W	14.8	+/-1.04	-0.200	+/-0.5	0.020	+/-0.05	0.100	+/-0.1	0.40	+/-0.5
Near Shanly Island	14	1	403	GL954049	14	1999/10/20	21.0	+/-2	0.0005	<=W	15.1	+/-1.06	-0.100	+/-0.5	0.010	+/-0.05	0.100	+/-0.1	0.30	+/-0.5
Near Little Detroit	14	1	404	GL954047	11	1999/10/20	8.0	+/-1	0.0005	<=W	13.7	+/-0.75	-0.200	+/-0.5	-0.010	+/-0.05	0.000	+/-0.1	0.50	+/-0.5
Nipigon Bay																				
Spring																				
Downstream of Nipigon R	1	1	458	GL978431	11	1999/05/22	106.0	+/-10.6	0.0005	<=W	9.9	+/-0.993	0.018	+/-0.1	0.006	+/-0.05	0.110	+/-0.1	1.06	+/-0.5
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL978430	11	1999/05/22	121.0	+/-12.1	0.0005	<=W	11.6	+/-1.16	0.011	+/-0.1	0.010	+/-0.05	0.110	+/-0.1	1.76	+/-0.5
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL978427	11	1999/05/22	98.2	+/-9.82	0.0005	<=W	10.5	+/-1.05	0.008	+/-0.1	0.000	+/-0.05	0.076	+/-0.1	1.47	+/-0.5
Nipigon Bay - West of Frog Island	1	1	869	GL978425	11	1999/05/22	143.0	+/-14.3	0.0005	<=W	10.6	+/-1.06	0.020	+/-0.1	0.008	+/-0.05	0.104	+/-0.1	1.40	+/-0.5
500 m south of mill outfall	1	1	1200	GL978428	14	1999/05/22	144.0	+/-14.4	0.0005	<=W	12.5	+/-1.25	0.027	+/-0.1	0.011	+/-0.05	0.108	+/-0.1	0.41	+/-0.5
500 m south of mill outfall	1	1	1200	GL978429	14	1999/05/22	143.0	+/-14.3	0.0005	<=W	12.9	+/-1.29	0.028	+/-0.1	0.222	+/-0.05	0.129	+/-0.1	0.40	+/-0.5
Summer																				
Downstream of Nipigon R	1	1	458	GL977420	11	1999/08/01	48.0	+/-3	0.0005	<=W	9.7	+/-0.55	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	3.30	+/-0.5
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL977417	14	1999/08/01	74.0	+/-19	0.0005	<=W	10.7	+/-0.65	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	4.00	+/-0.8
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL977418	14	1999/08/01	64.0	+/-3	0.0005	<=W	10.9	+/-0.63	0.000	+/-0.1	0.020	+/-0.05	0.100	+/-0.1	3.80	+/-0.5
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL977416	11	1999/08/01	46.0	+/-5	0.0005	<=W	10.2	+/-0.55	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	3.50	+/-0.5
Nipigon Bay - West of Frog Island	1	1	869	GL977415	11	1999/07/31	89.0	+/-5	0.0005	<=W	11.4	+/-0.62	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	3.60	+/-0.5
500 m south of mill outfall	1	1	1200	GL977419	11	1999/08/01	52.0	+/-4	0.0005	<=W	10.3	+/-0.7	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	3.30	+/-0.5
Fall																				
Downstream of Nipigon R	1	1	458	GL954015	11	1999/10/11	31.0	+/-2	0.0005	<=W	9.4	+/-0.6	0.000	+/-0.1	0.000	+/-0.05	0.000	+/-0.1	2.30	+/-0.5
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL954020	11	1999/10/11	65.0	+/-4	0.0005	<=W	10.2	+/-1.03	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	2.70	+/-0.5
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL954017	11	1999/10/11	74.0	+/-17	0.0005	<=W	10.5	+/-0.69	0.000	+/-0.1	19.900	+/-1.22	0.100	+/-0.1	3.70	+/-0.9
Nipigon Bay - West of Frog Island	1	1	869	GL954016	11	1999/10/11	66.0	+/-6	0.0005	<=W	10.5	+/-1.11	0.000	+/-0.1	0.000	+/-0.05	0.100	+/-0.1	1.30	+/-0.5
500 m south of mill outfall	1	1	1200	GL954018	14	1999/10/11	66.0	+/-5	0.0005	<=W	10.5	+/-0.56	0.000	+/-0.1	0.010	+/-0.05	0.100	+/-0.1	2.70	+/-0.5
500 m south of mill outfall	1	1	1200	GL954019	14	1999/10/11	66.0	+/-4	0.0005	<=W	10.3	+/-0.73	0.000	+/-0.1	0.040	+/-0.06	0.100	+/-0.1	2.70	+/-0.5

Table 2: Metal concentrations in water collected from Lake Superior and the Spanish River, 1999

Station Description	Station number			Field Sample number		Date YYYYMMDD	Aluminum ug/L		Arsenic ug/L		Barium ug/L		Beryllium ug/L		Cadmium ug/L		Cobalt ug/L		Chromium ug/L	
Jackfish Bay																				
Spring																				
Blackbird Creek - mouth	1	1	701	GL978421	11	1999/05/20	142.0	+/- 14.000	0.0005	<=W	41.7	+/- 2.200	-0.027	+/- 1.000	-0.011	+/- 0.500	0.120	+/- 1.000	4.56	+/- 5.000
Moberly Bay	1	1	702	GL978419	14	1999/05/20	27.2	+/- 11.000	0.0005	<=W	14.2	+/- 1.100	0.006	+/- 1.000	-0.086	+/- 0.500	0.034	+/- 1.000	1.82	+/- 5.000
Moberly Bay	1	1	702	GL978420	14	1999/05/20	26.2	+/- 10.000	0.0005	<=W	13.9	+/- 0.670	0.008	+/- 1.000	-0.088	+/- 0.500	0.026	+/- 1.000	2.05	+/- 5.000
Downstream of Moberly Bay	1	1	710	GL978416	11	1999/05/20	10.1	+/- 10.000	0.0005	<=W	10.2	+/- 0.780	-0.004	+/- 1.000	-0.091	+/- 0.510	0.012	+/- 1.000	1.21	+/- 5.000
Jackfish Bay	1	1	451	GL978417	11	1999/05/20	8.4	+/- 10.000	0.0005	<=W	9.9	+/- 0.710	0.014	+/- 1.000	-0.080	+/- 0.500	0.021	+/- 1.000	2.03	+/- 5.000
Near Terrance Bay at Kimberly Clark	1	1	452	GL978423	11	1999/05/20	3.3	+/- 10.000	0.0005	<=W	9.6	+/- 0.710	0.001	+/- 1.000	-0.111	+/- 0.510	0.017	+/- 1.000	1.86	+/- 5.000
Summer																				
Blackbird Creek - mouth	1	1	701	GL977429	11	1999/08/02	226.0	+/-12	0.0005	<=W	143.0	+/-74.7	0.000	+/-0.1	0.200	+/-0.19	0.200	+/-0.1	8.90	+/-0.6
Moberly Bay	1	1	702	GL977428	11	1999/08/02	26.0	+/-4	0.0005	<=W	17.7	+/-1.02	0.000	+/-0.1	0.030	+/-0.05	0.000	+/-0.1	2.40	+/-0.5
Downstream of Moberly Bay	1	1	710	GL977427	11	1999/08/02	12.0	+/-2	0.0005	<=W	11.8	+/-0.77	0.000	+/-0.1	0.030	+/-0.05	0.000	+/-0.1	1.90	+/-0.5
Jackfish Bay	1	1	451	GL977426	11	1999/08/02	10.0	+/-1	0.0005	<=W	11.7	+/-0.82	0.000	+/-0.1	0.030	+/-0.05	0.000	+/-0.1	2.00	+/-0.5
Near Terrance Bay at Kimberly Clark	1	1	452	GL977424	14	1999/08/02	5.0	+/-1	0.0005	<=W	10.4	+/-1.32	0.000	+/-0.1	0.010	+/-0.05	0.000	+/-0.1	1.80	+/-0.5
Near Terrance Bay at Kimberly Clark	1	1	452	GL977425	14	1999/08/02	5.0	+/-1	0.0005	<=W	10.2	+/-0.59	0.000	+/-0.1	0.010	+/-0.05	0.000	+/-0.1	1.80	+/-0.5
Fall																				
Blackbird Creek - mouth	1	1	701	GL954028	14	1999/10/13	79.0	+/-4	0.0005	<=W	20.7	+/-1.44	0.000	+/-0.1	0.040	+/-0.05	0.100	+/-0.1	2.30	+/-0.5
Blackbird Creek - mouth	1	1	701	GL954029	14	1999/10/13	81.0	+/-5	0.0005	<=W	22.1	+/-5.43	0.000	+/-0.1	0.040	+/-0.05	0.100	+/-0.1	2.30	+/-0.5
Moberly Bay	1	1	702	GL954027	11	1999/10/13	35.0	+/-8	0.0005	<=W	11.1	+/-0.73	0.000	+/-0.1	-0.010	+/-0.05	0.000	+/-0.1	0.90	+/-0.5
Downstream of Moberly Bay	1	1	710	GL954026	11	1999/10/13	9.0	+/-1	0.0005	<=W	9.3	+/-0.67	0.000	+/-0.1	0.000	+/-0.05	0.000	+/-0.1	0.80	+/-0.5
Jackfish Bay	1	1	451	GL954025	11	1999/10/13	6.0	+/-1	0.0005	<=W	9.4	+/-0.74	0.000	+/-0.1	0.010	+/-0.05	0.000	+/-0.1	1.70	+/-0.5
Near Terrance Bay at Kimberly Clark	1	1	452	GL954024	11	1999/10/13	5.0	+/-1	0.0005	<=W	9.1	+/-0.57	0.000	+/-0.1	0.000	+/-0.05	0.000	+/-0.1	1.80	+/-0.5
Pic River																				
Spring																				
Pic River	1	1	20	GL978410	14	1999/05/19	14.4	+/- 10.000	0.0005	<=W	9.7	+/- 0.810	0.011	+/- 1.000	-0.074	+/- 0.500	0.028	+/- 1.000	2.09	+/- 5.000
Pic River	1	1	20	GL978411	14	1999/05/19	14.4	+/- 10.000	0.0005	<=W	9.7	+/- 0.780	0.026	+/- 1.000	-0.097	+/- 0.510	0.024	+/- 1.000	2.18	+/- 5.000
Pic River - South of mouth	1	1	454	GL978413	11	1999/05/19	138.0	+/- 14.000	0.0005	<=W	11.2	+/- 0.850	0.007	+/- 1.000	-0.081	+/- 0.500	0.161	+/- 1.000	2.95	+/- 5.000
Pic River - west of mouth	1	1	457	GL978412	11	1999/05/19	182.0	+/- 17.000	0.0005	<=W	45.6	+/- 2.400	0.041	+/- 1.000	-0.044	+/- 0.500	0.491	+/- 1.000	31.00	+/- 5.300
North of Pic R. by Heron Bay	1	1	21	GL978414	11	1999/05/19	11.9	+/- 10.000	0.0005	<=W	9.7	+/- 0.920	0.009	+/- 1.000	-0.071	+/- 0.500	0.022	+/- 1.000	1.29	+/- 5.000
Summer																				
Pic River	1	1	20	GL977444	11	1999/08/05	39.4	+/- 3.94	0.0005	<=W	10.7	+/-1.07	-0.021	+/-0.1	0.038	+/-0.05	0.033	+/-0.1	1.79	+/-0.5
Pic River - mouth	1	1	453	GL977445	14	1999/08/05	175.0	+/- 17.5	0.0005	<=W	16.1	+/-1.61	0.023	+/-0.1	0.026	+/-0.05	0.189	+/-0.1	4.38	+/-0.5
Pic River - mouth	1	1	453	GL977446	14	1999/08/05	169.0	+/-16.9	0.0005	<=W	16.4	+/-1.64	-0.005	+/-0.1	0.026	+/-0.05	0.145	+/-0.1	3.73	+/-0.5
Pic River - mouth	1	1	453	GL977447	0	1999/08/05	1.2	+/-1	0.0005	<=W	0.0	+/-0.05	-0.004	+/-0.1	0.026	+/-0.05	0.009	+/-0.1	0.20	+/-0.5
North of Pic R. by Heron Bay	1	1	21	GL977443	11	1999/08/05	5.8	+/-1	0.0005	<=W	10.1	+/- 1.01	-0.010	+/-0.1	0.076	+/-0.05	0.027	+/-0.1	2.03	+/-0.5
Fall																				
Pic River	1	1	20	GL954037	14	1999/10/15	5.0	+/-1	0.0005	<=W	10.8	+/-0.63	0.200	+/-0.3	0.000	+/-0.05	0.000	+/-0.1	0.70	+/-0.5
Pic River	1	1	20	GL954038	14	1999/10/15	5.0	+/-1	0.0005	<=W	10.7	+/-0.78	0.000	+/-0.3	0.010	+/-0.05	0.000	+/-0.1	0.10	+/-0.5
Pic River - mouth	1	1	453	GL954039	11	1999/10/15	235.0	+/-18	0.0005	<=W	12.6	+/-0.9	0.100	+/-0.3	0.010	+/-0.05	0.300	+/-0.1	0.90	+/-0.5
Pic River - South of mouth	1	1	454	GL954040	11	1999/10/15	207.0	+/-14	0.0005	<=W	12.8	+/-0.73	-0.100	+/-0.2	0.010	+/-0.05	0.200	+/-0.1	1.00	+/-0.5
Pic River - west of mouth	1	1	457	GL954041	11	1999/10/15	227.0	+/- 16	0.0005	<=W	12.5	+/-0.81	0.100	+/-0.3	0.010	+/-0.05	0.200	+/-0.1	1.10	+/-0.5
North of Pic R. by Heron Bay	1	1	21	GL954036	11	1999/10/15	7.0	+/-1	0.0005	<=W	10.1	+/-0.66	0.200	+/-0.3	0.020	+/-0.05	0.000	+/-0.1	1.00	+/-0.4
PWQO (ug/L)							75		100				1100		0.2		0.9		Cr VI 1	

Table 2: Metal concentrations in water collected from Lake Superior and the Spanish River, 1999

Station Description	Station number		Field Sample number			Date YYYY/MM/DD	Copper ug/L	Iron ug/L	Mecury ng/L	Manganese ug/L	Molybdenum ug/L	Nickel ug/L	Lead ug/L	Strontium ug/L	Titanium ug/L	Vanadium ug/L	Zinc ug/L
Spanish River																	
Spring																	
Mouth of Spanish River	14	1	400	GL979861	11	1999/05/12	4.06 +/- 5.000	139.0 +/- 51.000	2.65	42.1 +/- 2.500	0.22 +/- 5.000	27.6 +/- 1.700	0.17 +/- 0.500	30.9 +/- 2.600	1.820 +/- 2.000	0.345 +/- 1.000	5.2 +/- 2.000
Whalesback Channel	14	1	401	GL979858	11	1999/05/12	2.48 +/- 5.000	88.5 +/- 53.000	2.10	24.0 +/- 2.200	0.24 +/- 5.000	21.7 +/- 1.800	0.18 +/- 0.500	45.7 +/- 2.800	0.922 +/- 2.000	0.205 +/- 1.000	8.9 +/- 2.100
Whalesback Channel (near Greenway Island)	14	1	209	GL979855	11	1999/05/12	2.35 +/- 5.000	83.6 +/- 50.000	2.40	21.5 +/- 1.600	0.30 +/- 5.000	21.1 +/- 2.000	0.00 +/- 0.500	40.6 +/- 3.400	0.855 +/- 2.000	0.174 +/- 1.000	3.6 +/- 2.100
Aird Bay	14	1	402	GL979858	14	1999/05/12	2.36 +/- 5.000	81.4 +/- 50.000	3.05	21.8 +/- 1.800	0.24 +/- 5.000	21.3 +/- 2.000	0.07 +/- 0.500	40.8 +/- 3.000	0.815 +/- 2.000	0.184 +/- 1.000	3.3 +/- 2.000
Aird Bay	14	1	402	GL979857	14	1999/05/12	2.40 +/- 5.000	85.2 +/- 50.000	3.45	22.2 +/- 1.500	0.23 +/- 5.000	21.2 +/- 2.000	0.07 +/- 0.500	46.7 +/- 3.200	0.893 +/- 2.000	0.197 +/- 1.000	3.1 +/- 2.000
Near Shanly Island	14	1	403	GL979859	11	1999/05/12	2.48 +/- 5.000	85.8 +/- 50.000	2.75	24.4 +/- 1.800	0.22 +/- 5.000	21.4 +/- 1.600	0.06 +/- 0.500	48.4 +/- 2.800	1.050 +/- 2.000	0.214 +/- 1.000	3.3 +/- 2.100
Near Little Detroit	14	1	404	GL979860	11	1999/05/12	0.74 +/- 5.000	4.2 +/- 50.000	2.05	2.5 +/- 1.000	0.30 +/- 5.000	2.1 +/- 1.100	0.02 +/- 0.500	77.7 +/- 4.300	0.408 +/- 2.000	0.169 +/- 1.000	1.2 +/- 2.000
Summer																	
Mouth of Spanish River	14	1	400	GL977455	11	1999/08/10	2.30 +/-0.5	133.0 +/-11	2.55	45.8 +/-3.8	0.30 +/-0.5	18.5 +/-1.0	0.12 +/-0.05	58.3 +/-5.8	2.000 +/-0.2	0.420 +/-0.05	2.8 +/-0.2
Whalesback Channel	14	1	401	GL977451	14	1999/08/10	1.10 +/-0.5	12.0 +/-5	8.40	7.0 +/-0.8	0.30 +/-0.5	6.3 +/-0.5	0.02 +/-0.05	65.1 +/-6.1	0.400 +/-0.2	0.170 +/-0.05	0.2 +/-0.2
Whalesback Channel	14	1	401	GL977452	14	1999/08/10	1.10 +/-0.5	14.0 +/-5	8.15	7.7 +/-0.8	0.30 +/-0.5	8.2 +/-0.8	0.04 +/-0.05	66.5 +/-3.7	0.400 +/-0.3	0.180 +/-0.05	1.0 +/-0.3
Whalesback Channel (near Greenway Island)	14	1	209	GL977450	11	1999/08/10	1.00 +/-0.5	7.0 +/-5	11.20	5.0 +/-0.5	0.30 +/-0.5	5.4 +/-0.4	0.02 +/-0.05	65.7 +/-0.3	0.300 +/-0.2	0.150 +/-0.05	0.4 +/-0.2
Aird Bay	14	1	402	GL977453	11	1999/08/10	1.10 +/-0.5	14.0 +/-5	1.80	8.4 +/-0.5	0.30 +/-0.5	0.0 +/-0.9	0.03 +/-0.05	62.8 +/-3.2	0.400 +/-0.2	0.100 +/-0.05	2.4 +/-0.4
Near Shanly Island	14	1	403	GL977454	11	1999/08/10	1.50 +/-0.5	31.0 +/-5	2.60	19.5 +/-1	0.30 +/-0.5	7.3 +/-0.5	0.05 +/-0.05	63.5 +/-3.8	0.600 +/-0.2	0.240 +/-0.05	1.5 +/-0.2
Near Little Detroit	14	1	404	GL977456	11	1999/08/10	0.50 +/-0.5	5.0 +/-5	1.90	1.5 +/-0.1	0.30 +/-0.5	2.0 +/-0.2	0.02 +/-0.05	79.8 +/-4.2	0.300 +/-0.2	0.140 +/-0.05	0.8 +/-0.4
Fall																	
Mouth of Spanish River	14	1	400	GL954053	11	1999/10/20	2.70 +/-0.5	193.0 +/-11	2.05	58.0 +/-3.7	0.30 +/-0.5	20.7 +/-1.2	0.10 +/-0.05	64.1 +/-3.8	3.100 +/-0.4	0.130 +/-0.08	3.4 +/-0.3
Whalesback Channel	14	1	401	GL954051	11	1999/10/20	1.30 +/-0.5	22.0 +/-5	0.45	15.8 +/-1.5	0.40 +/-0.5	4.1 +/-0.4	0.04 +/-0.05	75.0 +/-6.9	0.400 +/-0.4	0.120 +/-0.05	2.0 +/-0.2
Whalesback Channel (near Greenway Island)	14	1	209	GL954050	11	1999/10/20	1.30 +/-0.5	20.0 +/-5	0.50	10.3 +/-1.2	0.40 +/-0.5	4.2 +/-0.2	0.03 +/-0.05	76.3 +/-4.5	0.400 +/-0.2	0.100 +/-0.05	1.6 +/-0.2
Aird Bay	14	1	402	GL954052	11	1999/10/20	1.30 +/-0.5	54.0 +/-5	0.80	13.8 +/-0.8	0.40 +/-0.5	4.7 +/-0.3	0.07 +/-0.05	78.5 +/-7.5	1.200 +/-0.2	0.180 +/-0.05	1.0 +/-0.2
Near Shanly Island	14	1	403	GL954048	14	1999/10/20	1.60 +/-0.5	50.0 +/-7	1.25	27.4 +/-2.3	0.40 +/-0.5	7.6 +/-0.5	0.07 +/-0.05	72.8 +/-4.1	1.000 +/-0.3	0.000 +/-0.05	2.0 +/-0.2
Near Shanly Island	14	1	403	GL954049	14	1999/10/20	1.60 +/-0.5	50.0 +/-7	0.90	28.1 +/-1.7	0.40 +/-0.6	7.3 +/-0.0	0.08 +/-0.05	70.0 +/-5.5	0.900 +/-0.3	0.000 +/-0.05	2.1 +/-0.2
Near Little Detroit	14	1	404	GL954047	11	1999/10/20	0.90 +/-0.5	12.0 +/-5		3.8 +/-0.2	0.40 +/-0.5	1.8 +/-0.1	0.04 +/-0.05	83.1 +/-11.1	0.400 +/-0.3	0.090 +/-0.05	2.3 +/-0.4
Nipigon Bay																	
Spring																	
Downstream of Nipigon R	1	1	458	GL978431	11	1999/05/22	1.27 +/-0.5	125.0 +/-12.8	0.70	5.5 +/-0.546	0.00 +/-0.5	0.6 +/-0.40	0.36 +/-0.07	21.5 +/-2.15	0.240 +/-0.841	0.734 +/-0.073	10.6 +/-1.06
Nipigon Bay 30 m S of mill outfall	1	1	459	GL978430	11	1999/05/22	1.42 +/-0.5	115.0 +/-13.5	2.35	7.1 +/-0.712	0.17 +/-0.5	0.6 +/-0.172	0.06 +/-0.05	23.6 +/-2.36	8.210 +/-0.821	1.070 +/-0.125	1.3 +/-0.48
Nipigon Bay NW of Five Mile Pt	1	1	461	GL978427	11	1999/05/22	1.12 +/-0.5	103.0 +/-10.3	0.05	3.8 +/-0.394	0.08 +/-0.5	0.4 +/-0.325	0.04 +/-0.05	22.3 +/-2.23	4.820 +/-0.489	0.587 +/-0.05	0.7 +/-0.2
Nipigon Bay West of Frog Island	1	1	869	GL978425	11	1999/05/22	1.14 +/-0.5	153.0 +/-15.3	1.25	5.2 +/-0.517	0.12 +/-0.5	0.4 +/-0.108	0.08 +/-0.05	22.4 +/-2.24	7.400 +/-1.15	0.854 +/-0.072	0.8 +/-0.222
500 m south of mill outfall	1	1	1200	GL978428	14	1999/05/22	1.37 +/-0.5	145.0 +/-14.5	1.75	8.7 +/-0.872	0.17 +/-0.5	0.8 +/-0.51	0.00 +/-0.05	23.5 +/-2.35	8.840 +/-1.54	1.080 +/-0.108	1.5 +/-0.211
500 m south of mill outfall	1	1	1200	GL978429	14	1999/05/22	1.85 +/-0.5	144.0 +/-14.4	1.55	8.8 +/-0.69	0.15 +/-0.5	3.2 +/-0.321	0.20 +/-0.05	22.7 +/-2.27	8.760 +/-1.43	1.080 +/-0.108	1.8 +/-0.27
Summer																	
Downstream of Nipigon R	1	1	458	GL977420	11	1999/08/01	1.20 +/-0.5	47.0 +/-5	1.50	3.5 +/-0.2	0.10 +/-0.5	0.3 +/-0.4	0.05 +/-0.05	20.8 +/-1.2	3.200 +/-0.5	0.550 +/-0.05	1.8 +/-0.3
Nipigon Bay 30 m S of mill outfall	1	1	459	GL977417	14	1999/08/01	1.30 +/-0.5	77.0 +/-22	2.10	5.0 +/-0.9	0.10 +/-0.5	0.4 +/-0.8	0.00 +/-0.05	21.8 +/-1.5	4.800 +/-1.7	0.700 +/-0.14	1.5 +/-0.3
Nipigon Bay 30 m S of mill outfall	1	1	459	GL977418	14	1999/08/01	1.40 +/-0.5	89.0 +/-5	2.55	4.8 +/-0.3	0.10 +/-0.5	0.9 +/-0.8	0.27 +/-0.05	21.8 +/-1.3	4.300 +/-0.3	0.040 +/-0.08	2.4 +/-0.3
Nipigon Bay NW of Five Mile Pt	1	1	461	GL977416	11	1999/08/01	1.30 +/-0.5	42.0 +/-5	4.00	2.9 +/-0.3	0.10 +/-0.5	0.3 +/-0.4	0.08 +/-0.05	21.8 +/-1.2	3.600 +/-1.1	0.530 +/-0.07	2.0 +/-0.2
Nipigon Bay West of Frog Island	1	1	869	GL977415	11	1999/07/31	1.50 +/-0.5	75.0 +/-5	1.75	2.2 +/-0.1	0.10 +/-0.5	0.4 +/-0.8	0.06 +/-0.06	22.8 +/-1.3	5.000 +/-0.0	0.840 +/-0.08	1.7 +/-0.3
500 m south of mill outfall	1	1	1200	GL977419	11	1999/08/01	1.20 +/-0.5	52.0 +/-8	11.10	3.7 +/-0.2	0.10 +/-0.5	0.5 +/-0.5	0.03 +/-0.05	21.8 +/-1.6	3.300 +/-0.0	0.550 +/-0.05	1.5 +/-0.2
Fall																	
Downstream of Nipigon R	1	1	458	GL954015	11	1999/10/11	1.80 +/-0.5	47.0 +/-5	0.60	3.4 +/-0.2	0.10 +/-0.5	0.5 +/-0.2	0.00 +/-0.05	21.9 +/-1.9	1.500 +/-0.4	0.550 +/-0.05	1.8 +/-0.2
Nipigon Bay - 30 m S of mill outfall	1	1	459	GL954020	11	1999/10/11	1.30 +/-0.5	73.0 +/-5	0.40	4.0 +/-0.2	0.10 +/-0.5	0.9 +/-0.3	0.01 +/-0.05	22.7 +/-1.4	3.100 +/-0.3	0.550 +/-0.08	0.7 +/-0.5
Nipigon Bay - NW of Five Mile Pt	1	1	461	GL954017	11	1999/10/11	1.30 +/-0.5	89.0 +/-28	1.00	4.5 +/-1.1	0.20 +/-0.5	0.9 +/-0.2	0.05 +/-0.05	23.0 +/-1.5	3.500 +/-1.2	0.580 +/-0.11	0.8 +/-0.3
Nipigon Bay - West of Frog Island	1	1	869	GL954016	11	1999/10/11	1.30 +/-0.5	74.0 +/-11	0.45	4.1 +/-0.4	0.10 +/-0.5	0.4 +/-0.1	0.07 +/-0.05	22.0 +/-1.6	3.200 +/-0.6	0.510 +/-0.07	1.6 +/-0.2
500 m south of mill outfall	1	1	1200	GL954018	14	1999/10/11	1.40 +/-0.5	75.0 +/-6	0.40	4.1 +/-0.2	0.20 +/-0.5	0.8 +/-0.1	0.03 +/-0.12	22.9 +/-1.8	2.900 +/-0.5	0.540 +/-0.05	0.8 +/-0.2
500 m south of mill outfall	1	1	1200	GL954019	14	1999/10/11	1.40 +/-0.5	75.0 +/-6	0.10	4.1 +/-0.4	0.10 +/-0.5	1.0 +/-0.2	0.12 +/-0.10	22.8 +/-1.2	3.200 +/-0.5	0.550 +/-0.08	1.1 +/-0.2

Table 2: Metal concentrations in water collected from Lake Superior and the Spanish River, 1999

Station Description	Station number		Field sample number			Date YYYYMMDD	Copper ug/L	Iron ug/L	Mecury ng/L	Manganese ug/L	Molybdenum ug/L	Nickel ug/L	Lead ug/L	Strontium ug/L	Titanium ug/L	Vanadium ug/L	Zinc ug/L
Jackfish Bay																	
Spring																	
Blackbird Creek - mouth	1	1	701	GL078421	11	1999/05/20	0.17 +/- 5.000	160.0 +/- 54.000	1.25	104.0 +/- 11.000	0.32 +/- 5.000	1.5 +/- 1.000	0.08 +/- 0.500	57.0 +/- 3.300	5.410 +/- 2.100	3.230 +/- 1.100	11.9 +/- 2.100
Moberly Bay	1	1	702	GL078410	14	1999/05/20	0.04 +/- 5.000	31.9 +/- 50.000	0.05	24.1 +/- 1.800	0.10 +/- 5.000	0.2 +/- 1.000	0.01 +/- 0.500	24.0 +/- 1.800	1.110 +/- 2.000	0.715 +/- 1.000	1.1 +/- 2.000
Moberly Bay	1	1	702	GL078420	14	1999/05/20	0.25 +/- 5.000	30.3 +/- 50.000	0.80	23.6 +/- 1.800	0.09 +/- 5.000	0.2 +/- 1.000	-0.01 +/- 0.500	23.8 +/- 1.800	1.120 +/- 2.000	0.691 +/- 1.000	1.1 +/- 2.000
Downstream of Moberly Bay	1	1	710	GL078418	11	1999/05/20	0.14 +/- 5.000	9.9 +/- 50.000	1.25	3.2 +/- 1.000	0.10 +/- 5.000	0.1 +/- 1.000	-0.03 +/- 0.500	20.2 +/- 1.500	0.601 +/- 2.000	0.299 +/- 1.000	-0.1 +/- 2.000
Jackfish Bay	1	1	451	GL078417	11	1999/05/20	0.09 +/- 5.000	8.4 +/- 50.000	0.95	2.8 +/- 1.000	0.08 +/- 5.000	-0.1 +/- 1.000	-0.04 +/- 0.500	20.4 +/- 1.600	0.542 +/- 2.000	0.298 +/- 1.000	-0.1 +/- 2.000
Near Terrence Bay at Kimberly Clark	1	1	452	GL078423	11	1999/05/20	-0.90 +/- 5.000	3.8 +/- 51.000	1.30	0.4 +/- 1.000	0.12 +/- 5.000	-0.4 +/- 1.000	0.09 +/- 0.500	25.0 +/- 2.000	0.443 +/- 2.000	0.244 +/- 1.000	1.9 +/- 2.000
Summer																	
Blackbird Creek - mouth	1	1	701	GL077429	11	1999/08/02	3.30 +/-0.5	204.0 +/-15	5.70	461.0 +/-23.6	0.70 +/-0.5	5.4 +/-0.7	0.30 +/-0.1	79.8 +/-10.7	15.400 +/-2.1	6.700 +/-0.43	22.4 +/-1.2
Moberly Bay	1	1	702	GL077428	11	1999/08/02	1.10 +/-0.5	23.0 +/-5	1.75	40.5 +/-3.0	0.20 +/-0.5	0.5 +/-0.1	0.06 +/-0.05	26.2 +/-1.6	1.700 +/-0.2	0.740 +/-0.07	3.8 +/-0.3
Downstream of Moberly Bay	1	1	710	GL077427	11	1999/08/02	1.00 +/-0.5	6.0 +/-5	1.05	11.8 +/-0.0	0.10 +/-0.5	0.5 +/-0.2	0.04 +/-0.05	23.9 +/-2.4	1.200 +/-0.3	0.390 +/-0.08	2.0 +/-0.2
Jackfish Bay	1	1	451	GL077426	11	1999/08/02	1.00 +/-0.5	5.0 +/-5	2.85	0.4 +/-0.0	0.10 +/-0.5	0.4 +/-0.1	0.07 +/-0.05	23.5 +/-1.9	1.000 +/-0.5	0.360 +/-0.05	44.8 +/-2.5
Near Terrence Bay at Kimberly Clark	1	1	452	GL077424	14	1999/08/02	0.90 +/-0.5	0.0 +/-5	0.75	0.8 +/-0.1	0.20 +/-0.5	0.2 +/-0.3	0.02 +/-0.05	25.2 +/-0.6	0.000 +/-0.2	0.220 +/-0.05	1.7 +/-0.7
Near Terrence Bay at Kimberly Clark	1	1	452	GL077425	14	1999/08/02	1.50 +/-0.5	2.0 +/-5	0.45	0.8 +/-0.1	0.10 +/-0.5	0.2 +/-0.3	0.04 +/-0.05	23.1 +/-1.7	0.600 +/-0.4	0.230 +/-0.05	1.9 +/-0.3
Fall																	
Blackbird Creek - mouth	1	1	701	GL954026	14	1999/10/13	1.00 +/-0.5	70.0 +/-5	1.30	41.4 +/-2.2	0.20 +/-0.5	-0.3 +/-0.3	0.00 +/-0.05	30.2 +/-2.4	1.800 +/-0.2	0.860 +/-0.00	5.4 +/-1.4
Blackbird Creek - mouth	1	1	701	GL954029	14	1999/10/13	1.00 +/-0.5	78.0 +/-5	4.75	42.7 +/-2.3	0.20 +/-0.5	-0.1 +/-0.2	0.00 +/-0.00	30.7 +/-1.8	2.100 +/-0.3	0.870 +/-0.09	5.5 +/-0.8
Moberly Bay	1	1	702	GL054027	11	1999/10/13	0.60 +/-0.5	31.0 +/-8	2.75	7.7 +/-1.3	0.10 +/-0.5	-0.7 +/-0.7	0.02 +/-0.05	23.1 +/-1.7	1.300 +/-0.3	0.380 +/-0.08	1.3 +/-0.3
Downstream of Moberly Bay	1	1	710	GL954028	11	1999/10/13	0.50 +/-0.5	0.0 +/-5	0.70	0.0 +/-0.1	0.20 +/-0.5	-0.7 +/-0.7	0.00 +/-0.05	21.5 +/-1.3	0.400 +/-0.2	0.210 +/-0.05	1.1 +/-0.8
Jackfish Bay	1	1	451	GL954025	11	1999/10/13	0.50 +/-0.5	5.0 +/-5	1.10	0.6 +/-0.1	0.10 +/-0.5	-0.7 +/-0.7	0.02 +/-0.05	21.6 +/-1.4	0.300 +/-0.2	0.200 +/-0.05	0.7 +/-0.2
Near Terrence Bay at Kimberly Clark	1	1	452	GL954024	11	1999/10/13	0.50 +/-0.5	4.0 +/-5	0.95	0.2 +/-0.1	0.20 +/-0.5	-0.8 +/-0.8	0.02 +/-0.05	21.8 +/-1.5	0.300 +/-0.2	0.210 +/-0.05	0.6 +/-0.2
Pic River																	
Spring																	
Pic River	1	1	20	GL078410	14	1999/05/10	0.08 +/- 5.000	17.8 +/- 50.000	2.05	1.2 +/- 1.000	0.11 +/- 5.000	0.1 +/- 1.000	0.03 +/- 0.500	21.2 +/- 1.800	1.030 +/- 2.000	0.278 +/- 1.000	-0.3 +/- 2.000
Pic River	1	1	20	GL078411	14	1999/05/10	0.14 +/- 5.000	28.4 +/- 50.000	3.20	1.3 +/- 1.000	0.10 +/- 5.000	-0.1 +/- 1.000	0.02 +/- 0.500	21.2 +/- 1.500	1.000 +/- 2.000	0.205 +/- 1.000	2.0 +/- 2.000
Pic River - South of mouth	1	1	454	GL078413	11	1999/05/10	0.50 +/- 5.000	198.0 +/- 53.000	1.50	10.0 +/- 1.100	0.05 +/- 5.000	0.2 +/- 1.000	0.14 +/- 0.500	21.0 +/- 1.800	6.280 +/- 2.200	0.852 +/- 1.000	1.0 +/- 2.000
Pic River - west of mouth	1	1	457	GL078412	11	1999/05/10	4.73 +/- 5.000	238.0 +/- 52.000	74.10	231.0 +/- 12.000	0.26 +/- 5.000	1.0 +/- 1.000	0.00 +/- 0.500	150.0 +/- 15.000	11.000 +/- 2.100	1.500 +/- 1.000	1.9 +/- 2.000
North of Pic R. by Heron Bay	1	1	21	GL078414	11	1999/05/10	0.05 +/- 5.000	14.1 +/- 50.000	2.05	1.0 +/- 1.000	0.09 +/- 5.000	-0.1 +/- 1.000	0.03 +/- 0.500	19.8 +/- 2.000	0.908 +/- 2.000	0.280 +/- 1.000	0.0 +/- 2.000
Summer																	
Pic River	1	1	20	GL077444	11	1999/08/05	1.00 +/-0.5	50.8 +/-5	10.80	4.1 +/-0.405	0.18 +/-0.5	0.5 +/-0.314	0.01 +/-0.05	21.9 +/-13.8	2.800 +/-0.28	0.305 +/-0.1	1.7 +/-0.322
Pic River - mouth	1	1	453	GL077445	14	1999/08/05	1.73 +/-0.5	202.0 +/-20.2		24.2 +/-2.42	0.23 +/-0.5	1.0 +/-0.30	0.14 +/-0.05	43.7 +/-4.37	10.800 +/-1.81	0.963 +/-0.1	2.9 +/-0.286
Pic River - mouth	1	1	451	GL077446	14	1999/08/05	1.70 +/-0.5	260.0 +/-26.0	0.05	24.2 +/-2.42	0.23 +/-0.5	1.3 +/-0.153	0.20 +/-0.05	43.3 +/-4.33	12.200 +/-1.89	0.985 +/-0.1	2.8 +/-0.281
Pic River - mouth	1	1	453	GL077447	0	1999/08/05	0.02 +/-0.5	3.5 +/-5		0.1 +/-0.1	0.00 +/-0.5	0.0 +/-0.1	0.00 +/-0.05	0.0 +/- 0.1	0.162 +/-0.327	-0.036 +/-0.1	1.8 +/-0.722
North of Pic R. by Heron Bay	1	1	21	GL077443	11	1999/08/05	1.25 +/-0.5	5.7 +/-5	3.30	0.8 +/-0.1	0.18 +/-0.5	0.5 +/-0.162	0.05 +/-0.05	22.2 +/-2.22	0.863 +/-0.342	0.205 +/-0.1	2.1 +/-0.21
Fall																	
Pic River	1	1	20	GL954037	14	1999/10/15	1.80 +/-0.5	8.0 +/-5	0.05 <=W	0.6 +/-0.1	0.20 +/-0.5	-0.1 +/-0.1	0.17 +/-0.05	24.9 +/-1.7	0.400 +/-0.4	0.260 +/-0.05	2.4 +/-0.2
Pic River	1	1	20	GL954038	14	1999/10/15	1.00 +/-0.5	0.0 +/-5	0.15 <T	0.5 +/-0.1	0.20 +/-0.5	-0.1 +/-0.1	0.00 +/-0.05	24.3 +/-1.8	0.300 +/-0.8	0.250 +/-0.05	1.0 +/-0.3
Pic River - mouth	1	1	453	GL954039	11	1999/10/15	1.40 +/-0.5	407.0 +/-20	0.25	25.3 +/-1.3	0.10 +/-0.5	0.4 +/-0.1	0.23 +/-0.05	30.7 +/-2.2	0.100 +/-0.8	0.880 +/-0.08	4.2 +/-0.5
Pic River - South of mouth	1	1	454	GL954040	11	1999/10/15	1.40 +/-0.5	380.0 +/-38	2.80	21.0 +/-2.2	0.10 +/-0.5	0.4 +/-0.1	0.19 +/-0.05	34.7 +/-2.7	7.800 +/-1	0.810 +/-0.1	3.5 +/-0.2
Pic River - west of mouth	1	1	457	GL954041	11	1999/10/15	1.50 +/-0.5	400.0 +/-27	1.10	25.1 +/-1.5	0.10 +/-0.5	0.5 +/-0.1	0.20 +/-0.05	35.7 +/-2.3	7.800 +/-1	0.820 +/-0.07	4.2 +/-0.2
North of Pic R. by Heron Bay	1	1	21	GL954036	11	1999/10/15	2.00 +/-0.5	10.0 +/-5	0.05 <=W	0.0 +/-0.1	0.20 +/-0.5	0.1 +/-0.1	0.32 +/-0.05	23.1 +/-1.6	0.500 +/-0.4	0.250 +/-0.05	2.3 +/-0.3
PWQO (ug/L)							5	100	0.2		40	25	25			6	20

Table 2 Metal concentrations in water samples collected from Lake Superior and Spanish River, 1999

Station Description	Station number			Field Sample		Date	Aluminum ug/L		Arsenic mg/L		Barium ug/L		Beryllium ug/L		Cadmium ug/L		Cobalt ug/L		Chromium ug/L		Copper ug/L		Iron ug/L		Mecury ng/L	
Thunder Bay																										
Spring																										
Kam R. at Mission River	1	1	802	GL978437	14*	1999/05/25	158	+/-15.8	0.0005	<=W	16.2	+/-1.62	0.011	+/-0.1	0.012	+/-0.05	0.056	+/-0.1	6.7	+/-0.667	2.6	+/-0.5	243	+/-32.7	13.4	
Kam R. at Mission River	1	1	602	GL978438	14	1999/05/25	605	+/-60.5	0.0005	<=W	21.1	+/-2.11	0.020	+/-0.1	0.049	+/-0.05	0.374	+/-0.1	2.0	+/-0.5	3.4	+/-0.5	902	+/-90.2	10.7	
Kam River - mouth	1	1	463	GL978436	11	1999/05/25	244	+/-24.4	0.0005	<=W	16.7	+/-1.67	0.030	+/-0.1	0.011	+/-0.05	0.180	+/-0.1	1.1	+/-0.5	1.9	+/-0.5	468	+/-64.4	6.8	
Mission River - mouth	1	1	176	GL978439	11	1999/05/25	589	+/-58.9	0.0005	<=W	21.2	+/-2.12	0.003	+/-0.1	0.070	+/-0.05	0.390	+/-0.1	1.7	+/-0.5	3.1	+/-0.5	865	+/-86.5	13.4	
McKellar River - mouth	1	1	462	GL978442	11	1999/05/26	275	+/- 18.000	0.0005	<=W	21.0	+/- 1.700	0.006	+/- 1.000	0.036	+/- 0.500	0.265	+/- 1.000	2.2	+/- 5.000	2.6	+/- 5.000	546	+/- 59.000	5.9	
Mission River transect	1	1	664	GL978441	11	1999/05/26	358	+/- 29.000	0.0005	<=W	19.8	+/- 1.400	0.032	+/- 1.000	0.043	+/- 0.500	0.335	+/- 1.000	2.2	+/- 5.000	2.9	+/- 5.000	596	+/- 60.000	7.3	
Between McKellar & Kam River	1	1	672	GL978435	11	1999/05/25	74	+/-7.37	0.0005	<=W	11.0	+/-1.1	-0.004	+/-0.1	0.010	+/-0.05	0.079	+/-0.1	1.1	+/-0.5	0.9	+/-0.5	116	+/-11.6	2.5	
North of Mission Bay Disposal	1	1	464	GL978440	11	1999/05/26	251	+/-25.1	0.0005	<=W	15.4	+/-1.54	0.015	+/-0.1	0.056	+/-0.05	0.171	+/-0.1	1.3	+/-0.5	1.9	+/-0.5	454	+/-45.4	7.5	
Provincial Paper (outside filtration bed)	1	1	465	GL978445	11	1999/05/26	84	+/- 11.000	0.0005	<=W	13.1	+/- 1.100	0.039	+/- 1.000	0.028	+/- 0.500	0.083	+/- 1.000	1.4	+/- 5.000	1.3	+/- 5.000	162	+/- 52.000	6.2	
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL978443	11	1999/05/26	27	+/- 10.000	0.0005	<=W	11.6	+/- 1.200	0.023	+/- 1.000	0.044	+/- 0.500	0.090	+/- 1.000	1.4	+/- 5.000	1.7	+/- 5.000	40	+/- 51.000	1.9	
North Entrance	1	1	467	GL978444	11	1999/05/26	71	+/- 11.000	0.0005	<=W	12.7	+/- 0.930	0.018	+/- 1.000	0.017	+/- 0.500	0.089	+/- 1.000	1.3	+/- 5.000	1.3	+/- 5.000	140	+/- 51.000	3.2	
Summer																										
Kam R. at Mission River	1	1	802	GL977404	11	1999/07/29	122	+/-12.2	0.0005	<=W	15.3	+/-1.53	0.011	+/-0.1	0.037	+/-0.06	0.134	+/-0.1	2.1	+/-0.5	1.5	+/-0.5	203	+/-20.3	4.8	
Kam River - mouth	1	1	463	GL977406	11	1999/07/29	77	+/-7.65	0.0005	<=W	13.4	+/-1.34	-0.002	+/-0.1	0.039	+/-0.05	0.086	+/-0.1	1.5	+/-0.5	1.2	+/-0.5	112	+/-11.2	4.3	
Mission River - mouth	1	1	176	GL977405	11	1999/07/29	112	+/-11.2	0.0005	<=W	15.9	+/-1.59	0.015	+/-0.1	0.036	+/-0.05	0.147	+/-0.1	1.5	+/-0.5	1.3	+/-0.5	204	+/-20.4	3.8	
McKellar River - mouth	1	1	462	GL977406	11	1999/07/29	82	+/-8.2	0.0005	<=W	14.3	+/-1.43	0.015	+/-0.1	0.042	+/-0.05	0.121	+/-0.1	1.4	+/-0.5	1.2	+/-0.5	140	+/-14	2.3	
Mission River transect	1	1	664	GL977402	14	1999/07/29	48	+/-5.03	0.0005	<=W	11.4	+/-1.14	0.007	+/-0.1	0.035	+/-0.05	0.085	+/-0.1	1.9	+/-0.5	0.9	+/-0.5	72	+/-7.23	2.9	
Mission River transect	1	1	664	GL977403	14	1999/07/29	49	+/-4.91	0.0005	<=W	11.5	+/-1.15	0.011	+/-0.1	0.045	+/-0.05	0.088	+/-0.1	1.7	+/-0.5	0.8	+/-0.5	71	+/-5	9.6	
Between McKellar & Kam River	1	1	672	GL977407	11	1999/07/29	54	+/-5.38	0.0005	<=W	12.0	+/-1.2	0.006	+/-0.1	0.040	+/-0.05	0.094	+/-0.1	1.6	+/-0.5	0.9	+/-0.5	78	+/-5	3.9	
North of Mission Bay Disposal	1	1	464	GL977401	11	1999/07/29	49	+/-5.28	0.0005	<=W	11.3	+/-1.13	0.009	+/-0.1	0.033	+/-0.05	0.099	+/-0.1	1.7	+/-0.5	0.9	+/-0.5	64	+/-5	2.9	
Provincial Paper (outside filtration bed)	1	1	465	GL977411	11	1999/07/29	56	+/-5.59	0.0005	<=W	12.0	+/-1.2	-0.005	+/-0.1	0.045	+/-0.05	0.042	+/-0.1	1.9	+/-0.5	1.0	+/-0.5	66	+/-7.18	14.0	
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL977409	11	1999/07/29	18	+/-3.66	0.0005	<=W	10.5	+/-1.05	-0.010	+/-0.1	0.025	+/-0.05	0.031	+/-0.1	2.2	+/-0.5	0.9	+/-0.5	17	+/-5	2.7	
North Entrance	1	1	467	GL977410	11	1999/07/29	30	+/-3.44	0.0005	<=W	11.5	+/-1.15	-0.015	+/-0.1	0.033	+/-0.05	0.035	+/-0.1	1.6	+/-0.5	1.0	+/-0.5	46	+/-7.94	3.2	
Fall																										
Kam R. at Mission River	1	1	802	GL954005	11	1999/10/10	356	+/-19	0.0005	<=W	20.1	+/-1.24	0.000	+/-0.1	0.020	+/-0.06	0.300	+/-0.1	2.4	+/-0.5	2.5	+/-0.5	544	+/-28	5.8	
Kam River - mouth	1	1	463	GL954005	11	1999/10/10	199	+/-10	0.0005	<=W	16.6	+/-1.16	0.000	+/-0.1	0.030	+/-0.06	0.100	+/-0.1	2.0	+/-0.5	1.8	+/-0.5	299	+/-18	2.9	
Mission River - mouth	1	1	176	GL954004	11	1999/10/10	349	+/-18	0.0005	<=W	20.2	+/-1.1	0.000	+/-0.1	0.030	+/-0.06	0.300	+/-0.1	2.3	+/-0.5	2.9	+/-0.5	559	+/-36	5.9	
McKellar River - mouth	1	1	462	GL954006	11	1999/10/10	130	+/-7	0.0005	<=W	14.8	+/-0.98	0.000	+/-0.1	0.040	+/-0.07	0.100	+/-0.1	2.2	+/-0.5	1.6	+/-0.5	281	+/-15	2.7	
Mission River transect	1	1	664	GL954002	14	1999/10/10	294	+/-18	0.0005	<=W	19.3	+/-1.19	0.000	+/-0.1	0.050	+/-0.05	0.300	+/-0.1	2.4	+/-0.5	2.3	+/-0.5	511	+/-28	5.3	
Mission River transect	1	1	664	GL954003	14	1999/10/10	298	+/-18	0.0005	<=W	19.2	+/-1.05	0.000	+/-0.1	0.040	+/-0.05	0.200	+/-0.1	2.3	+/-0.5	2.3	+/-0.5	509	+/-40	5.5	
Between McKellar & Kam River	1	1	672	GL954007	11	1999/10/10	46	+/-2	0.0005	<=W	11.2	+/-0.68	0.000	+/-0.1	0.030	+/-0.07	0.000	+/-0.1	1.9	+/-0.5	1.3	+/-0.5	98	+/-6	1.0	
North of Mission Bay Disposal	1	1	464	GL954001	11	1999/10/10	81	+/-5	0.0005	<=W	12.1	+/-0.79	0.000	+/-0.1	0.090	+/-0.05	0.100	+/-0.1	1.0	+/-0.5	1.3	+/-0.5	182	+/-15	1.4	
Provincial Paper (outside filtration bed)	1	1	465	GL954011	11	1999/10/10	64	+/-3	0.0005	<=W	10.8	+/-0.59	0.000	+/-0.1	0.030	+/-0.06	0.100	+/-0.1	2.5	+/-0.5	1.1	+/-0.5	80	+/-5	11.9	
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL954009	11	1999/10/10	19	+/-2	0.0005	<=W	9.9	+/-0.63	0.000	+/-0.1	0.000	+/-0.06	0.000	+/-0.1	1.3	+/-0.5	0.9	+/-0.5	22	+/-5	0.1	<T
North Entrance	1	1	467	GL954010	11	1999/10/10	34	+/-6	0.0005	<=W	10.5	+/-0.54	0.000	+/-0.1	0.020	+/-0.06	0.100	+/-0.1	1.8	+/-0.5	1.0	+/-0.5	58	+/-13	1.3	
Peninsula Harbour																										
Spring																										
Jellicoe Cove - Near wharf	1	1	276	GL978401	11	1999/05/17	8	+/- 10.000	0.0005	<=W	9.7	+/- 0.700	-0.020	+/- 1.000	-0.017	+/- 0.510	0.024	+/- 1.000	1.6	+/- 5.000	0.6	+/- 5.000	2	+/- 50.000	3.0	
Jellicoe Cove - Near wharf	1	1	279	GL978402	14	1999/05/17	8	+/- 10.000	0.0005	<=W	10.0	+/- 0.850	0.002	+/- 1.000	-0.006	+/- 0.500	0.043	+/- 1.000	1.4	+/- 5.000	0.7	+/- 5.000	0	+/- 50.000	3.2	
Jellicoe Cove - Near wharf	1	1	279	GL978403	14	1999/05/17	8	+/- 10.000	0.0005	<=W	10.0	+/- 0.710	-0.006	+/- 1.000	-0.025	+/- 0.500	0.024	+/- 1.000	1.9	+/- 5.000	0.6	+/- 5.000	1	+/- 50.000	1.9	
Marathon Bay - New mill Discharge pt	1	1	470	GL978404	11	1999/05/17	8	+/- 10.000	0.0005	<=W	9.7	+/- 0.740	-0.044	+/- 1.000	-0.041	+/- 0.500	0.019	+/- 1.000	1.7	+/- 5.000	0.5	+/- 5.000	2	+/- 50.000	1.9	
Upstream - new mill discharge pt	1	1	471	GL978405	11	1999/05/17	10	+/- 10.000	0.0005	<=W	10.2	+/- 1.300	-0.001	+/- 1.000	-0.046	+/- 0.500	0.020	+/- 1.000	1.6	+/- 5.000	0.6	+/- 5.000	2	+/- 50.000	1.9	
500 m south of STP	1	1	409	GL978409	11	1999/05/19	8	+/- 10.000	0.0005	<=W	9.6	+/- 0.740	0.031	+/- 1.000	-0.020	+/- 0.500	0.022	+/- 1.000	2.5	+/- 5.000	0.1	+/- 5.000	8	+/- 50.000	1.1	
Summer																										
Jellicoe Cove - Near wharf	1	1	276	GL977437	14	1999/08/04	8	+/-1.3	0.0005	<=W	10.0	+/-1.27	0.007	+/-0.1	0.034	+/-0.05	0.012	+/-0.1	2.0	+/-0.5	1.0	+/-0.5	10	+/-5	1.1	
Jellicoe Cove - Near wharf	1	1	276	GL977438	14	1999/08/04	8	+/-1	0.0005	<=W	10.3	+/-1.03	-0.019	+/-0.1	0.036	+/-0.05	0.023	+/-0.1	2.3	+/-0.5	1.0	+/-0.5	9	+/-5	0.7	
Jellicoe Cove - Near wharf	1	1	279	GL977439	11	1999/08/04	9	+/-1	0.0005	<=W	10.2	+/-1.02	-0.017	+/-0.1	0.024	+/-0.05	0.025	+/-0.1	1.8	+/-0.5	0.9	+/-0.5	10	+/-5	0.3	
Marathon Bay - New mill Discharge pt	1	1	470	GL977433	11	1999/08/04	9	+/-2.39	0.0005	<=W	10.4	+/-1.04	0.000	+/-0.1	0.028	+/-0.05	0.013	+/-0.1	2.1	+/-0.653	0.9	+/-0.5	10	+/-10.6	4.5	
Upstream new mill discharge pt	1	1	471	GL977434	11	1999/08/04	21	+/-2.41	0.0005	<=W	10.4	+/-1.04	-0.003	+/-0.1	0.018	+/-0.05	0.034	+/-0.1	2.4	+/-0.5	0.8	+/-0.5	17	+/-5	0.5	
500 m south of STP	1	1	409	GL977435	11	1999/08/04	7.8	+/-1	0.0005	<=W	9.89	+/-0.989	-0.006	+/-0.1	0.023	+/-0.05	0.008	+/-0.1	2.6	+/-0.5	1.0	+/-0.5	9	+/-5	1.6	
Fall																										
Jellicoe Cove Near wharf	1	1	276	GL954042	11	1999/10/15	7	+/-1	0.0005	<=W	10.2	+/-0.83	-0.100	+/-0.3	0.010	+/-0.05	0.000	+/-0.1	0.4	+/-0.5	1.0	+/-0.5	11	+/-5	0.8	
Jellicoe Cove - Near wharf	1	1	279	GL954043	14	1999/10/15	9	+/-1	0.0005	<=W	11.1	+/-0.87	-0.100	+/-0.5	0.010	+/-0.05	0.000	+/-0.1	0.5	+/-0.5	1.1	+/-0.5	12	+/-5	2.2	
Jellicoe Cove - Near wharf	1	1	279	GL954044	14	1999/10/15	9	+/-1	0.0005	<=W	11.3	+/-0.82	0.000	+/-0.3	0.000	+/-0.05	0.000	+/-0.1	0.4	+/-0.5	1.1	+/-0.5	13	+/-5	1.1	
Marathon Bay - New mill Discharge pt	1	1	470	GL954035	11	1999/10/15	7	+/-1	0.0005	<=W	11.2	+/-0.68	-0.100	+/-0.4	0.000	+/-0.05	0.000	+/-0.1	0.8	+/-0.5	4.9	+/-0.5	9	+/-6	0.5	
Upstream - new mill discharge pt	1	1	471	GL954034	11	1999/10/15	8	+/-1	0.0005	<=W	10.5	+/-0.6	0.000	+/-0.3	0.000	+/-0.05	0.000	+/-0.1	0.7	+/-0.5	1.0	+/-0.5	11	+/-5	0.1	<=W
500 m south of STP	1	1	409	GL977435	11	1999/10/15	15	+/-1	0.0005	<=W	10.0	+/-0.59	-0.100	+/-0.4	0.010	+/-0.05	0.000	+/-0.1	0.4	+/-0.5	1.0	+/-0.5	17	+/-5	0.05	<=W
PWQO (ug/L)							75		100				1100		0.2		0.9		Cr VI 1		5		300		0.2	

<W no measurable response

<T measurable trace amount, interpret with caution

14 - split sample

11 - surface grab sample

Table 2 Metal concentrations in water samples collected from Lake Superior and Spanish River, 1999

Station Description	Station number			Field Sample		Date	Manganese ug/L		Molybdenum ug/L		Nickel ug/L		Lead ug/L		Strontium ug/L		Titanium ug/L		Vanadium ug/L		Zinc ug/L	
Thunder Bay																						
Spring																						
Kam R. at Mission River	1	1	802	GL976437	14*	1999/05/25	2.17	+/-0.217	0.376	+/-0.5	1.28	+/-0.1	0.05	+/-0.05	30.4	+/-3.04	7.1	+/-0.705	1.020	+/-0.102	1.0	+/-0.292
Kam R. at Mission River	1	1	802	GL976436	14	1999/05/25	43.70	+/-4.37	0.243	+/-0.5	2.10	+/-0.557	0.31	+/-0.00	31.3	+/-3.13	16.7	+/-2.00	1.890	+/-0.189	5.6	+/-0.555
Kam River - mouth	1	1	463	GL976438	11	1999/05/25	32.80	+/-3.28	0.192	+/-0.5	0.87	+/-0.41	0.18	+/-0.057	31.2	+/-3.12	10.2	+/-2.61	0.961	+/-0.173	9.9	+/-0.99
Mission River - mouth	1	1	176	GL976439	11	1999/05/25	44.40	+/-4.44	0.109	+/-0.5	1.09	+/-0.346	0.27	+/-0.058	31.7	+/-3.17	17.1	+/-2.12	1.920	+/-0.407	5.6	+/-0.56
McKellar River - mouth	1	1	462	GL976442	11	1999/05/26	43.20	+/- 2.400	0.308	+/- 5.000	1.78	+/- 1.200	0.22	+/- 0.500	34.4	+/- 3.400	4.8	+/- 2.100	1.140	+/- 1.000	4.8	+/- 2.100
Mission River transect	1	1	664	GL976441	11	1999/05/26	35.30	+/- 2.100	0.269	+/- 5.000	1.66	+/- 1.100	0.23	+/- 0.500	31.3	+/- 1.800	5.6	+/- 2.000	1.350	+/- 1.000	6.5	+/- 2.100
Between McKellar & Kam River	1	1	672	GL976435	11	1999/05/25	6.90	+/-0.69	0.119	+/-0.5	0.28	+/-0.218	0.06	+/-0.06	22.0	+/-2.2	3.7	+/-1.81	0.429	+/-0.05	1.0	+/-0.292
North of Mission Bay Disposal	1	1	494	GL976440	11	1999/05/26	22.50	+/-2.25	0.248	+/-0.5	1.15	+/-0.139	0.14	+/-0.05	27.0	+/-2.7	9.1	+/-1.38	1.250	+/-0.125	4.7	+/-0.565
Provincial Paper (outside filtration bed)	1	1	465	GL976445	11	1999/05/26	11.20	+/- 1.200	0.232	+/- 5.000	0.77	+/- 1.000	0.09	+/- 0.500	21.9	+/- 2.200	2.0	+/- 2.200	0.569	+/- 1.000	1.7	+/- 2.000
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL976443	11	1999/05/26	2.79	+/- 1.000	0.172	+/- 5.000	0.63	+/- 1.000	0.08	+/- 0.500	24.2	+/- 2.000	1.3	+/- 2.000	0.265	+/- 1.000	4.3	+/- 2.000
North Entrance	1	1	467	GL976444	11	1999/05/26	8.92	+/- 1.100	0.162	+/- 5.000	0.65	+/- 1.100	0.10	+/- 0.500	22.7	+/- 2.100	2.0	+/- 2.000	0.481	+/- 1.000	2.2	+/- 2.000
Summer																						
Kam R. at Mission River	1	1	802	GL977404	11	1999/07/29	25.60	+/-2.56	0.229	+/-0.5	2.03	+/-0.619	0.12	+/-0.05	25.9	+/-2.59	5.9	+/-1.77	0.600	+/-0.1	4.5	+/-0.445
Kam River - mouth	1	1	463	GL977408	11	1999/07/29	14.20	+/-1.42	0.228	+/-0.5	2.12	+/-0.413	0.08	+/-0.05	26.4	+/-2.64	3.8	+/-0.370	0.416	+/-0.1	4.2	+/-0.418
Mission River - mouth	1	1	176	GL977405	11	1999/07/29	28.50	+/-2.85	0.260	+/-0.5	2.14	+/-0.214	1.06	+/-3.30	25.8	+/-2.58	5.8	+/-1.74	0.676	+/-0.1	3.7	+/-0.369
McKellar River - mouth	1	1	462	GL977406	11	1999/07/29	22.20	+/-2.22	0.278	+/-0.5	2.30	+/-0.447	0.10	+/-0.05	25.2	+/-2.52	4.3	+/-1.59	0.539	+/-0.1	3.4	+/-0.412
Mission River transect	1	1	664	GL977402	14	1999/07/29	5.98	+/-0.598	0.194	+/-0.5	1.50	+/-0.165	0.07	+/-0.05	23.8	+/-2.38	2.9	+/-0.595	0.333	+/-0.1	1.5	+/-0.217
Mission River transect	1	1	664	GL977403	14	1999/07/29	5.96	+/-0.596	0.191	+/-0.5	1.74	+/-0.358	0.06	+/-0.05	23.6	+/-2.36	2.9	+/-0.433	0.323	+/-0.1	1	+/-0.408
Between McKellar & Kam River	1	1	672	GL977407	11	1999/07/29	8.19	+/-0.819	0.194	+/-0.5	2.06	+/-0.729	0.06	+/-0.05	24.3	+/-2.43	3.3	+/-1.24	0.371	+/-0.1	1.6	+/-0.254
North of Mission Bay Disposal	1	1	464	GL977401	11	1999/07/29	4.35	+/-0.435	0.209	+/-0.5	1.71	+/-0.171	0.07	+/-0.05	22.8	+/-2.20	3.1	+/-0.839	0.343	+/-0.1	1.6	+/-0.241
Provincial Paper (outside filtration bed)	1	1	465	GL977411	11	1999/07/29	8.23	+/-0.823	0.551	+/-0.5	0.37	+/-0.548	0.12	+/-0.05	24.1	+/-2.41	3.9	+/-0.788	0.652	+/-0.1	1.9	+/-0.289
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL977409	11	1999/07/29	1.17	+/-0.12	0.267	+/-0.5	0.24	+/-0.254	0.07	+/-0.05	22.2	+/-2.22	1.3	+/-0.145	0.205	+/-0.1	1.0	+/-0.312
North Entrance	1	1	467	GL977410	11	1999/07/29	5.78	+/-0.578	0.310	+/-0.5	0.32	+/-0.103	0.06	+/-0.052	23.5	+/-2.35	2.3	+/-0.79	0.328	+/-0.1	1.5	+/-0.33
Fall																						
Kam R. at Mission River	1	1	802	GL954005	11	1999/10/10	30.60	+/-2	0.100	+/-0.5	1.90	+/-0.2	0.22	+/-0.1	29.3	+/-1.7	4.7	+/-0.6	1.160	+/-0.07	7.6	+/-0.6
Kam River - mouth	1	1	463	GL954008	11	1999/10/10	34.50	+/-2.1	0.100	+/-0.5	1.20	+/-0.2	0.15	+/-0.07	28.7	+/-1.5	2.5	+/-0.3	0.630	+/-0.05	4.6	+/-0.4
Mission River - mouth	1	1	176	GL954004	11	1999/10/10	37.10	+/-2	0.200	+/-0.5	2.00	+/-0.1	0.27	+/-0.09	29.7	+/-2.2	5.1	+/-1	1.160	+/-0.08	6.2	+/-0.3
McKellar River - mouth	1	1	462	GL954006	11	1999/10/10	27.70	+/-1.6	0.100	+/-0.5	1.10	+/-0.3	0.18	+/-0.08	25.4	+/-1.4	2.4	+/-0.3	0.610	+/-0.08	4.2	+/-0.4
Mission River transect	1	1	664	GL954002	14	1999/10/10	37.50	+/-2.2	0.200	+/-0.5	1.60	+/-0.1	0.18	+/-0.05	27.9	+/-1.7	4.6	+/-0.9	1.060	+/-0.07	5.0	+/-0.6
Mission River transect	1	1	664	GL954003	14	1999/10/10	37.70	+/-2.6	0.200	+/-0.5	1.70	+/-0.3	0.24	+/-0.2	26.5	+/-2.2	4.5	+/-0.9	1.060	+/-0.09	5.0	+/-0.3
Between McKellar & Kam River	1	1	672	GL954007	11	1999/10/10	6.30	+/-0.3	0.100	+/-0.5	0.70	+/-0.1	0.13	+/-0.11	23.6	+/-1.3	1.3	+/-0.3	0.290	+/-0.05	3.2	+/-1.7
North of Mission Bay Disposal	1	1	464	GL954001	11	1999/10/10	12.70	+/-0.7	0.100	+/-0.5	0.80	+/-0.1	0.00	+/-0.05	23.1	+/-1.5	2.2	+/-0.4	0.550	+/-0.07	2.4	+/-0.3
Provincial Paper (outside filtration bed)	1	1	465	GL954011	11	1999/10/10	6.10	+/-0.3	0.200	+/-0.5	0.80	+/-0.2	0.15	+/-0.08	23.4	+/-1.2	2.4	+/-0.4	0.510	+/-0.05	2.7	+/-0.2
Old Abitibi outfall (north of Bare Pt.)	1	1	466	GL954009	11	1999/10/10	1.30	+/-0.2	0.000	+/-0.5	0.60	+/-0.2	0.01	+/-0.07	22.1	+/-2.4	0.9	+/-0.2	0.200	+/-0.06	1.9	+/-0.3
North Entrance	1	1	467	GL954010	11	1999/10/10	4.60	+/-0.8	0.100	+/-0.5	0.00	+/-0.2	0.06	+/-0.09	23.2	+/-1.4	1.3	+/-0.2	0.260	+/-0.14	2.3	+/-0.3
Peninsula Harbour																						
Spring																						
Jellicoe Cove - Near wharf	1	1	276	GL976401	11	1999/05/17	0.75	+/- 1.000	0.167	+/- 5.000	-0.03	+/- 1.000	0.01	+/- 0.500	23.1	+/- 1.700	0.0	+/- 2.000	0.368	+/- 1.000	1.0	+/- 2.100
Jellicoe Cove Near wharf	1	1	278	GL976402	14	1999/05/17	0.64	+/- 1.000	0.147	+/- 5.000	0.60	+/- 1.000	0.06	+/- 0.500	23.0	+/- 2.000	0.5	+/- 2.000	0.303	+/- 1.000	1.9	+/- 2.000
Jellicoe Cove Near wharf	1	1	278	GL976403	14	1999/05/17	0.88	+/- 1.000	0.127	+/- 5.000	-0.04	+/- 1.000	0.07	+/- 0.500	25.6	+/- 1.700	0.6	+/- 2.000	0.302	+/- 1.000	1.5	+/- 2.000
Marathon Bay New mill Discharge pt	1	1	470	GL976404	11	1999/05/17	0.65	+/- 1.000	0.117	+/- 5.000	-0.06	+/- 1.000	-0.02	+/- 0.500	23.5	+/- 1.800	0.6	+/- 2.000	0.316	+/- 1.000	0.1	+/- 2.000
Upstream - new mill discharge pt	1	1	471	GL976405	11	1999/05/17	1.25	+/- 1.000	0.097	+/- 5.000	-0.06	+/- 1.000	-0.02	+/- 0.500	23.3	+/- 2.000	0.7	+/- 2.000	0.437	+/- 1.000	0.3	+/- 2.000
500 m south of STP	1	1	409	GL976409	11	1999/05/18	0.69	+/- 1.000	0.113	+/- 5.000	-0.16	+/- 1.000	0.01	+/- 0.500	21.4	+/- 1.800	0.6	+/- 2.000	0.276	+/- 1.000	0.5	+/- 2.000
Summer																						
Jellicoe Cove Near wharf	1	1	276	GL977437	14	1999/08/04	1.12	+/-0.1	0.164	+/-0.5	0.41	+/-0.241	0.02	+/-0.05	23.0	+/-2.3	0.8	+/-0.233	0.213	+/-0.1	1.7	+/-0.203
Jellicoe Cove Near wharf	1	1	276	GL977438	14	1999/08/04	1.04	+/-0.1	0.247	+/-0.5	0.44	+/-0.361	0.02	+/-0.05	23.0	+/-2.3	0.9	+/-0.283	0.208	+/-0.1	1.2	+/-0.216
Jellicoe Cove Near wharf	1	1	278	GL977439	11	1999/08/04	1.21	+/-0.1	0.214	+/-0.5	0.63	+/-0.1	0.01	+/-0.05	25.2	+/-2.52	0.8	+/-0.131	0.268	+/-0.1	1.1	+/-0.112
Marathon Bay New mill Discharge pt	1	1	470	GL977433	11	1999/08/04	1.48	+/-0.407	0.206	+/-0.5	0.35	+/-0.268	0.01	+/-0.05	23.0	+/-2.3	0.8	+/-0.138	0.258	+/-0.1	1.3	+/-0.131
Upstream - new mill discharge pt	1	1	471	GL977434	11	1999/08/04	1.53	+/-0.157	0.176	+/-0.5	0.16	+/-0.313	0.00	+/-0.05	23.2	+/-2.32	1.3	+/-0.147	0.254	+/-0.1	1.3	+/-0.459
500 m south of STP	1	1	409	GL077435	11	1999/08/04	0.67	+/-0.1	0.186	+/-0.5	0.31	+/-0.333	0.03	+/-0.05	23.0	+/-2.3	1.1	+/-0.910	0.188	+/-0.1	1.6	+/-0.348
Fall																						
Jellicoe Cove Near wharf	1	1	276	GL954042	11	1999/10/15	0.70	+/-0.1	0.100	+/-0.5	-0.10	+/-0.1	0.01	+/-0.05	24.4	+/-2.2	0.4	+/-0.5	0.240	+/-0.05	2.2	+/-0.2
Jellicoe Cove Near wharf	1	1	279	GL954043	14	1999/10/15	0.60	+/-0.1	0.100	+/-0.5	-0.10	+/-0.1	0.33	+/-0.05	26.2	+/-1.9	0.3	+/-0.3	0.200	+/-0.05	3.1	+/-0.3
Jellicoe Cove Near wharf	1	1	279	GL954044	14	1999/10/15	0.80	+/-0.1	0.100	+/-0.5	-0.10	+/-0.1	0.01	+/-0.05	25.9	+/-1.4	0.4	+/-0.4	0.300	+/-0.07	2.0	+/-0.3
Marathon Bay New mill Discharge pt	1	1	470	GL954035	11	1999/10/15	4.00	+/-0.4	0.100	+/-0.5	-0.10	+/-0.1	0.01	+/-0.05	25.4	+/-1.7	0.1	+/-0.4	0.400	+/-0.06	0.6	+/-0.2
Upstream new mill discharge pt	1	1	471	GL954034	11	1999/10/15	1.60	+/-0.2	0.100	+/-0.5	-0.10	+/-0.1	0.06	+/-0.05	24.7	+/-1.5	0.3	+/-0.4	0.290	+/-0.05	0.9	+/-0.2
500 m south of STP	1	1	409	GL077435	11	1999/10/15	1.40	+/-0.1	0.200	+/-0.5	-0.10	+/-0.1	0.03	+/-0.05	25.2	+/-2.7	0.6	+/-0.4	0.280	+/-0.04	0.4	+/-0.2
PWQO (ug/L)									40		25		[illegible]						6		20	

- W no measurable response
- T measurable trace amount, interpret with caution

14 split sample
11 surface grab sample

Table 3: Metal concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Aluminum ug/g	Arsenic ug/g	RMK	Cadmium ug/g	RMK	Chromium ug/g	Copper ug/g	RMK	Iron ug/g	Mercury ug/g	RMK	Manganese ug/g	Nickel ug/g	Lead ug/g	RMK	Zinc ug/g	RMK
Spanish River																								
Mouth of Spanish River	14	1	400	19990810	55	GL977680	2.2	5300	0.7	<T	0.2	<=W	12	7		8800	0.01	<=W	280	41	7	<T	36	
	14	1	400	19990810	51	GL977681	2.1	5000	0.5	<T	0.2	<=W	10	5		7900	0.01	<=W	200	38	3	<T	34	
	14	1	400	19990810	51	GL977682	0.2	5300	0.7	<T	0.5	<T	13	8		8600	0.01	<=W	270	46	6	<T	38	
Index Station	14	1	39	19990811	51	GL977851	9.8	14000			0.8	<T	44	42		25000	0.05		670	150**	22		120	
	14	1	39	19990811	51	GL977852	9.8	14000			0.7	<T	43	42		24000	0.05		800	140**	21		110	
	14	1	39	19990811	51	GL977853	9.9	13000			0.7	<T	43	44		24000	0.05		780	140**	21		110	
	14	1	39	19990811	51	GL977854	9.8	14000			0.7	<T	44	42		25000	0.04	<T	800	140**	20		110	
	14	1	39	19990811	51	GL977855	9.7	14000			0.8	<T	44	42		25000	0.05		890	140**	21		110	
	14	1	39	19991019	54	GL953010	7.3	14000			1.6		46	65		25000	0.05		1900**	280**	18		140	
Whalesback Channel	14	1	401	19990810	51	GL977670	22.7	21000	14.0		2.0		63	100		38000	0.11		3500**	450**	51		220	
	14	1	401	19990810	51	GL977671	22.7	21000	16.0		2.2		63	120**		40000**	0.10		3200**	540**	59		250	
	14	1	401	19990810	51	GL977672	22.7	21000	14.0		2.5		65	120**		40000**	0.07		3200**	590**	67		250	
Whalesback Channel (near Greenway Island)	14	1	209	19990810	51	GL977667	14.9	24000	27.0		3.2		74	160**		46000**	0.11		4200**	810	90		250	
	14	1	209	19990810	51	GL977668	14.9	24000	29.0		3.2		75	160**		45000**	0.11		3900**	840**	88		250	
	14	1	209	19990810	51	GL977669	15.6	25000	34.0**		3.3		71	160**		47000**	0.16		5000**	830**	95		250	
Aird Bay	14	1	402	19990810	51	GL977673	8.1	18000	13.0		1.4		57	87		42000**	0.01	<=W	1200**	380**	46		250	
	14	1	402	19990810	51	GL977674	8.1	18000	13.0		1.4		56	86		42000**	0.01	<=W	1300**	370**	45		250	
	14	1	402	19990810	55	GL977675	8.1	19000	15.0		1.6		57	88		43000**	0.01	<=W	1300**	380**	47		250	
	14	1	402	19990810	55	GL977676	8.1	18000	14.0		1.4		58	90		43000**	0.01	<=W	1300**	390**	47		250	
Near Shanly Island	14	1	403	19990810	51	GL977677	11.7	16000	4.0		1.0		49	53		28000	0.01	<=W	1300**	200**	24		250	
	14	1	403	19990810	51	GL977678	11.9	16000	4.2		1.1		48	52		28000	0.01	<=W	1400**	200**	24		250	
	14	1	403	19990810	51	GL977679	2.2	16000	4.5		1.1		49	54		28000	0.01	<=W	1200**	200**	25		250	
Near Little Detroit	14	1	404	19990810	51	GL977683	33.7	22000	18.0		2.3		59	88		36000	0.01	<=W	2800**	460**	82		250	
	14	1	404	19990810	51	GL977684	33.3	22000	19.0		2.6		58	84		36000	0.01	<=W	3400**	450**	80		250	
	14	1	404	19990810	51	GL977685	33.2	22000	20.0		2.3		58	82		37000	0.01	<=W	4600**	400**	78		250	
Nipigon Bay																								
Downstream of Nipigon R	1	1	458	19990731	51	GL977631	28.7	14000	2.4		0.2	<=W	35	25		20000	0.02	<T	440	20	10		39	
	1	1	458	19990731	51	GL977632	28.7	15000	2.2		0.2	<=W	36	26		20000	0.01	<=W	420	20	8	<T	38	
	1	1	458	19990731	51	GL977633	28.6	15000	2.4		0.2	<=W	36	25		20000	0.02	<T	450	21	8	<T	38	
Nipigon Bay - 30 m S of mill outfall	1	1	459	19990731	51	GL977628	2.8	13000	1.6		0.2	<=W	33	32		15000	0.27		200	20	10		62	
	1	1	459	19990731	51	GL977629	3.0	13000	1.6		0.2	<=W	31	27		14000	0.24		180	19	10		54	
	1	1	459	19990731	55	GL977630	3.0	11000	2.1		0.2	<=W	27	26		12000	0.34		160	16	9	<T	54	
Nipigon Bay - NW of Five Mile Pt	1	1	461	19990731	51	GL977624	21.6	17000	4.5		0.3	<T	44	37		22000	0.09		360	26	12		65	
	1	1	461	19990731	51	GL977625	21.6	18000	3.8		0.3	<T	44	36		23000	0.06		370	26	14		65	
	1	1	461	19990731	55	GL977626	21.6	17000	4.8		0.5	<T	45	40		22000	0.09		340	28	14		70	
	1	1	461	19990731	55	GL977627	21.6	17000	4.8		0.4	<T	44	39		22000	0.09		350	25	14		69	
Nipigon Bay - Index Station	1	1	286	19990731	51	GL977811	14.0	24000			0.3	<T	55	34		31000	0.03	<T	870	37	15		72	
	1	1	286	19990731	51	GL977812	14.0	23000			0.4	<T	54	33		30000	0.02	<T	910	35	13		70	
	1	1	286	19990731	51	GL977813	14.0	24000			0.4	<T	56	34		31000	0.02	<T	820	36	14		71	
	1	1	286	19990731	51	GL977814	14.0	23000			0.4	<T	54	33		30000	0.01	<=W	870	35	14		69	
	1	1	286	19990731	51	GL977815	14.0	24000			0.3	<T	55	34		31000	0.01	<=W	910	36	13		71	
	1	1	286	19991011	54	GL953003	12.2	24000			0.9	<T	60	37		32000	0.02	<T	720	39	13		77	
Nipigon Bay - West of Frog Island	1	1	869	19990731	51	GL977621	30.0	22000	4.1		0.2	<=W	50	31		29000	0.04	<T	730	31	15		62	
	1	1	869	19990731	51	GL977622	30.0	22000	3.6		0.2	<=W	52	32		30000	0.04	<T	670	32	15		65	
	1	1	869	19990731	51	GL977623	29.6	22000	4.0		0.2	<=W	51	31		29000	0.03	<T	720	31	14		64	

Table 3: Metal concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Aluminum ug/g	Arsenic ug/g	RMK	Cadmium ug/g	RMK	Chromium ug/g	Copper ug/g	RMK	Iron ug/g	Mercury ug/g	RMK	Manganese ug/g	Nickel ug/g	Lead ug/g	RMK	Zinc ug/g	RMK
Jackfish Bay																								
Blackbird Creek - mouth	1	1	701	19990802	55	GL977644	1.8	5800	0.6	<T	0.2	<=W	23	5		11000	0.04	<T	150	10	2	<=W	35	
	1	1	701	19990802	51	GL977645	1.8	6000	0.6	<T	0.2	<=W	25	4	<T	13000	0.02	<T	160	11	5	<T	34	
	1	1	701	19990802	51	GL977646	1.7	6100	0.6	<T	0.2	<=W	21	4	<T	10000	0.02	<T	160	11	5	<T	34	
Moberly Bay	1	1	702	19990802	51	GL977640	18.2	9700	1.8		1.1		55	28		16000	0.09		300	22	10		140	
	1	1	702	19990802	51	GL977641	18.2	9800	2.0		1.0		54	28		16000	0.19		290	22	9	<T	140	
	1	1	702	19990802	55	GL977642	18.2	10000	1.9		1.1		54	30		16000	0.10		290	23	11		140	
	1	1	702	19990802	55	GL977643	18.2	10000	2.0		1.0		64	30		17000	0.10		300	23	10		140	
Downstream of Moberly Bay	1	1	710	19990802	51	GL977637	34.2	12000	2.8		0.7	<T	62	27		22000	0.06		760	24	14		100	
	1	1	710	19990802	51	GL977638	31.5	8600	2.2		0.4	<T	39	17		18000	0.04	<T	440	17	11		66	
	1	1	710	19990802	51	GL977639	32.0	9100	2.6		0.5	<T	48	18		20000	0.06		570	19	9	<T	72	
Jackfish Bay	1	1	451	19990731	51	GL977634	41.2	13000	4.2		0.7	<T	47	41		22000	0.13		580	25	27		90	
	1	1	451	19990731	51	GL977635	41.0	14000	4.6		0.8	<T	49	44		23000	0.11		590	26	29		94	
	1	1	451	19990731	51	GL977636	40.6	14000	4.2		0.7	<T	48	38		23000	0.09		630	25	26		86	
Jackfish Bay - Index Station	1	1	288	19990803	55	GL977821	18.4	7700			0.2	<=W	41	11		24000	0.01	<=W	480	18	11		39	
	1	1	288	19990803	55	GL977822	18.1	8100			0.2	<=W	42	11		26000	0.01	<=W	620	19	11		42	
	1	1	288	19990803	51	GL977823	18.6	7400			0.2	<=W	36	11		20000	0.01	<=W	420	17	7	<T	40	
	1	1	288	19990803	51	GL977824	18.8	7400			0.3	<T	34	11		18000	0.01	<=W	280	16	9	<T	37	
	1	1	288	19990803	51	GL977825	18.9	7000			0.2	<=W	37	9		20000	0.01	<=W	230	14	6	<T	32	
	1	1	288	19991013	54	GL953005	42.7	16000			1.5		110''	62		25000	0.10		1200''	55	22		120	
Pic River																								
Pic River	1	1	20	19990805	51	GL977660	11.2	8100	1.6		0.2	<=W	23	10		12000	0.04	<T	320	11	3	<T	28	
	1	1	20	19990805	51	GL977661	11.2	7700	1.7		0.2	<=W	22	10		11000	0.01	<=W	330	11	5	<T	28	
	1	1	20	19990805	51	GL977662	11.2	8300	1.6		0.2	<=W	24	10		11000	0.01	<=W	330	11	9	<T	79	
Pic River - mouth	1	1	453	19990805	55	GL977663	11.9	6200	1.4		0.4	<T	22	4	<T	14000	0.01	<=W	200	10	4	<T	28	
	1	1	453	19990805	55	GL977664	11.9	6100	1.3		0.2	<=W	23	5		14000	0.01	<=W	200	10	2	<=W	20	<T
	1	1	453	19990805	51	GL977665	11.6	5500	1.2		0.2	<=W	20	3	<T	11000	0.01	<=W	180	9	3	<T	17	<T
	1	1	453	19990805	51	GL977666	12.1	6400	1.5		0.2	<=W	21	4	<T	12000	0.01	<=W	190	10	4	<T	19	<T
Pic River - South of mouth	1	1	454	19991015	51	GL955001	2.0	4600	1.6		0.2	<=W	15	2	<T	9100		!MI	150	8	2	<=W	15	<T
Pic River - west of mouth	1	1	457	19991015	51	GL955002	2.1	4600	1.6		0.2	<=W	13	2	<T	8400		!MI	140	8	3	<T	14	<T
Lowest Effect Level (ug/g)									**6.0**		**0.6**		**26**	**16**		**2%**	**0.20**		**460**	**16**	**31**		**120**	
Severe Effect Level (ug/g)									33.0		10.0		110	110		4%	2.00		1100	75	250		820	
Background - Great Lakes pre-colonial sediment horizon, Persaud et al. (1992)									4.2		1.1		31	25		3%	0.10		400	31	23		65	
Background - Lake Superior pre colonial sediment horizon depositional basin, Mudroch et al. (1988) (n=1)											0.4-0.7		26.1-73.1	30 84			0.04-0.66			24.4 - 69.8	29.5 - 68		53 137.1	

<W no measurable response
<T measurable trace amount, interpret with caution

Table 3: Metal concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			TKN mg/g	RMK	Total Phosphorus mg/g	Barium ug/g	Beryllium ug/g	RMK	Calcium ug/g	Cobalt ug/g	RMK	Magnesium ug/g	Molybdenum ug/g	RMK	Strontium ug/g	Titanium ug/g	Vanadium ug/g	LOI (mg/g)	RMK	TOC (mg/g)	RMK	Gravel %	RMK	Sand %	Silt & Clay %	RMK	Clay %	Silt %	Sand %	RMK
Spanish River																															
Mouth of Spanish River	14	1	400	0.1	<=W	0.28	21	0.5	<=W	3100	8		2800	0.5	<=W	19	750	19	8		2	<T	0		87	13					
	14	1	400	1.8		0.20	19	0.5	<=W	2700	8		2600	0.5	<=W	18	620	16	5		1	<=W	0		92	8					
	14	1	400	0.2	<T	0.28	22	0.5	<=W	3200	9		2800	0.5	<=W	20	710	20	8		1	<=W	0		86	14					
Index Station	14	1	39	0.6		0.96															13							23	77	1	<=W
	14	1	39	0.5		0.94															15							22	75	2	<T
	14	1	39	0.6		0.86															16							22	75	2	<T
	14	1	39																		14							23	77	1	<=W
	14	1	39																		16							23	75	2	<T
	14	1	39																		39							24	73	3	<T
Whalesback Channel	14	1	401	2.6		1.40	210	0.8	<T	8000	57		9200	0.5	<=W	46	1400	70	67		28		2		47	51					
	14	1	401	0.8		1.40	200	0.8	<T	7800	64		9400	0.5	<=W	44	1300	71	64		25		3		50	47					
	14	1	401	0.8		1.30	200	0.9	<T	7700	69		9500	0.5	<=W	44	1400	71	63		25		3		49	48					
Whalesback Channel (near Greenway Island)	14	1	209	2.9		1.70	250	1.0	<T	7900	88		10000	0.5	<=W	48	1400	80	65		23		1		13	45					
	14	1	209	2.3		1.70	250	1.0	<T	7900	90		10000	0.5	<=W	48	1400	79	63		25		2		54	44					
	14	1	209	2.9		1.60	260	1.0	<T	8300	91		10000	0.5	<=W	51	1300	82	66		24		1		54	45					
Aird Bay	14	1	402	2.2		1.10	110	0.8	<T	8000	46		8400	0.9	<T	44	1400	63	61		21		1		36	63					
	14	1	402	2.6		0.96	110	0.8	<T	7700	45		8400	0.5	<=W	42	1400	63	59		25		3		41	56					
	14	1	402	2.9		1.00	120	0.7	<T	8100	46		8500	0.5	<=W	44	1400	64	59		25		1		37	62					
	14	1	402	3.7		1.00	120	0.7	<T	7500	47		8400	0.5	<=W	40	1300	63	59		23		2		41	57					
Near Shanty Island	14	1	403	0.6		0.98	99	0.6	<T	7600	28		7600	0.5	<=W	42	1400	53	62		20		2		31	67					
	14	1	403	0.7		1.00	100	0.6	<T	7200	29		7600	0.5	<=W	38	1200	51	49		20		2		24	74					
	14	1	403	0.8		1.00	100	0.6	<T	7200	28		7600	0.5	<=W	38	1300	52	50		22		3		32	65					
Near Little Detroit	14	1	404	2.2		1.30	210	0.9	<T	8000	39		9700	1.2	<T	45	1100	66	74		26		1		55	44					
	14	1	404	2.1		0.94	220	0.9	<T	7900	38		9600	0.8	<T	45	1100	65	78		33		1		57	43					
	14	1	404	1.2		1.10	250	1.0	<T	8400	37		9600	1.2	<T	48	1100	66	78		33		1		54	45					
Nipigon Bay																															
Downstream of Nipigon R	1	1	458	0.8		0.64	57	0.5	<=W	47000	9		24000	0.5	<=W	40	1200	53	30		20		0		33	67					
	1	1	458	0.5		0.56	53	0.5	<=W	46000	9		23000	0.5	<=W	42	1300	56	28		32		0		32	67					
	1	1	458	0.9		0.56	54	0.5	<=W	46000	9		24000	0.5	<=W	42	1300	55	30		24		0		32	68					
Nipigon Bay - 30 m S of mill outfall	1	1	459	2.3		0.72	41	0.5	<=W	16000	7		8500	0.5	<=W	26	970	48	230		120**		1		66	31					
	1	1	459	2.2		0.66	39	0.5	<=W	14000	7		7600	0.5	<=W	25	920	46	240		120**		1		69	30					
	1	1	459	1.6		0.60	32	0.5	<=W	12000	6		6000	0.5	<=W	22	790	41	340		190**		2		71	27					
Nipigon Bay - NW of Five Mile Pt	1	1	461	1.6		0.76	69	0.5	<=W	30000	10		22000	0.5	<=W	33	1300	55	100		55		1		39	61					
	1	1	461	1.5		0.76	73	0.5	<=W	32000	11		23000	0.5	<=W	35	1300	56	110		62		1		42	56					
	1	1	461	1.5		0.76	67	0.5	<=W	29000	11		21000	0.5	<=W	33	1300	56	130		75		0		43	57					
	1	1	461	1.7		0.76	69	0.5	<=W	29000	10		21000	0.5	<=W	34	1300	56	130		60		0		40	60					
Nipigon Bay - Index Station	1	1	286	0.7		0.72															13							36	63	1	<=W
	1	1	286	0.7		0.68															12							36	63	1	<=W
	1	1	286	0.6		0.64															10							37	63	1	<=W
	1	1	286																		12							37	63	1	<=W
	1	1	286																		10							36	64	1	<=W
	1	1	286																		14							39	61	1	<=W
Nipigon Bay - West of Frog Island	1	1	869	3.7		0.64	94	0.6	<T	34000	13		25000	0.5	<=W	40	1500	64	31		22		1		47	52					
	1	1	869	0.4	<T	0.46	99	0.6	<T	34000	13		26000	0.5	<=W	42	1600	67	31		20		0		46	54					
	1	1	869	0.1	<=W	0.64	98	0.6	<T	34000	13		26000	0.5	<=W	42	1600	66	29		10		1		50	49					

Table 3: Metal concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			TKN mg/g	RMK	Total Phosphorus mg/g	Barium ug/g	Beryllium ug/g	RMK	Calcium ug/g	Cobalt ug/g	RMK	Magnesium ug/g	Molybdenum ug/g	RMK	Strontium ug/g	Titanium ug/g	Vanadium ug/g	LOI (mg/g)	RMK	TOC (mg/g)	RMK	Gravel %	RMK	Sand %	Silt & Clay %	RMK	Clay %	Silt %	Sand %	RMK
Jackfish Bay																															
Blackbird Creek - mouth	1	1	701	1.4		0.48	23	0.5	<=W	4600	4		3800	0.5	<=W	48	1000	30	7		2	<T	0		96	4					
	1	1	701	1.7		0.46	23	0.5	<=W	4900	4		3900	0.5	<=W	52	970	31	7		3	<T	0		96	4					
	1	1	701	1.4		0.40	25	0.5	<=W	4700	4		3900	0.6	<T	52	990	27	8		3	<T	0		97	3					
Moberly Bay	1	1	702	2.6		0.82	62	0.5	<=W	15000	7		9700	0.5	<=W	31	1200	43	130		83		0		37	63					
	1	1	702	2.4		0.90	62	0.5	<=W	15000	7		10000	0.6	<T	32	1200	44	130		78		0		37	63					
	1	1	702	2.3		0.96	61	0.5	<=W	13000	7		9000	0.7	<T	31	1200	44	140		80		0		38	61					
	1	1	702	2.3		0.92	63	0.5	<=W	14000	7		9300	0.6	<T	33	1200	45	130		77		0		41	59					
Downstream of Moberly Bay	1	1	710	1.3		1.00	67	0.5	<=W	10000	8		8200	0.5	<=W	40	1700	56	59		34		0		42	58					
	1	1	710	0.8		1.00	38	0.5	<=W	8300	6		6300	0.5	<=W	36	1500	47	38		20		0		63	37					
	1	1	710	0.6		0.96	41	0.5	<=W	7900	7		6300	0.8	<T	36	1400	50	32		19		0		60	40					
Jackfish Bay	1	1	451	1.2		1.10	68	0.6	<T	8600	9		7800	0.5	<=W	38	1600	56	54		10		0		40	59					
	1	1	451	1.1		0.92	73	0.6	<T	8200	9		7700	0.5	<=W	37	1600	57	56		28		0		37	63					
	1	1	451	1.3		0.98	65	0.5	<=W	8400	10		7600	0.5	<=W	46	1700	59	47		25		0		50	50					
Jackfish Bay - Index Station	1	1	288	0.1	<=W	0.88															6							5	17	78	
	1	1	288	0.1	<=W	1.10															1	<=W						7	23	70	
	1	1	288	0.1	<=W	0.88															6							4	15	80	
	1	1	288																		5							4	15	81	
	1	1	288																		4	<T						4	12	84	
	1	1	288																		51							23	72	5	
Pic River																															
Pic River	1	1	20	0.9		0.50	42	0.5	<=W	97000	4		31000	0.5	<=W	59	810	26	24		14		0		24	75					
	1	1	20	1.3		0.48	41	0.5	<=W	93000	4		31000	0.5	<=W	56	770	25	27		18		0		19	81					
	1	1	20	1.4		0.48	42	0.5	<=W	98000	4		32000	0.5	<=W	61	840	26	23		15		1		21	78					
Pic River - mouth	1	1	453	0.9		0.32	16	0.5	<=W	46000	4		11000	0.5	<=W	41	840	29	6		1	<=W	4		84	12					
	1	1	453	1.4		0.28	16	0.5	<=W	47000	4		11000	0.5	<=W	40	930	32	6		3	<T	3		86	11					
	1	1	453	1.3		0.28	16	0.5	<=W	45000	4		10000	0.6	<T	39	790	25	6		2	<T	2		89	9					
	1	1	453	1.4		0.30	19	0.5	<=W	44000	4		10000	0.5	<=W	41	860	26	19		10		4		89	8					
Pic River - South of mouth	1	1	454	0.1	<=W	0.32	15	0.5	<=W	25000	3		7100	0.5	<=W	27	630	19	2	<T	9		0		96	3					
Pic River - west of mouth	1	1	457	0.1	<=W	0.24	18	0.5	<=W	22000	2	<T	6600	0.5	<=W	27	590	17	3		1	<=W	0		94	6					
Lowest Effect Level (ug/g)				**550.0**		**600.00**															**1%**										
Severe Effect Level (ug/g) **				4800.0		2000.00															10%										
Background - Great Lakes pre-colonial sediment horizon, Persaud et al. (1992)																															
Background - Lake Superior pre-colonial sediment horizon-depositional basin, Mudroch et al. (1988) (n=1)																															

<=W no measurable response
<T measurable trace amount, interpret with caution

Table 3 Metal concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Aluminum ug/g	Arsenic ug/g	RMK	Cadmium ug/g	RMK	Chromium ug/g	Copper ug/g	RMK	Iron ug/g	Mercury ug/g	RMK	Manganese ug/g	Nickel ug/g	Lead ug/g	RMK	Zinc ug/g	RMK	TKN mg/g	RMK
Thunder Bay																										
Kam R. at Mission River	1	1	802	19990729	55	GL977604	8.2	23000	11.0		0.5	<T	50	56		43000**	0.16		510	38	16		140		1.3	
(split sample)	1	1	802	19990729	55	GL977605	8.2	24000	7.0		0.8	<T	52	59		45000**	0.18		550	39	15		140		1.5	
(split sample)	1	1	802	19990729	55	GL977606	8.2	24000	9.9		0.8	<T	50	57		44000**	0.17		540	38	19		140		1.8	
	1	1	802	19990729	55	GL977607	8.1	23000	9.7		0.8	<T	52	56		43000**	0.17		500	38	17		140		1.2	
Kam River - mouth	1	1	463	19990729	55	GL977614	8.8	17000	6.0		0.3	<T	38	24		37000	0.05		350	26	9	<T	89		0.7	
	1	1	463	19990729	55	GL977615	8.0	16000	4.6		0.2	<=W	38	23		37000	0.05		350	20	8	<T	88		0.5	
	1	1	463	19990729	51	GL977618	9.2	15000	4.5		0.2	<=W	35	21		35000	0.05		330	25	12		84		0.5	
Mission River - mouth	1	1	176	19990729	51	GL977608	8.1	19000	5.4		0.4	<T	41	29		36000	0.08		450	28	14		97		0.7	
	1	1	176	19990729	51	GL977609	8.1	20000	8.8		0.3	<T	43	32		39000	0.10		480	30	13		110		0.5	
	1	1	176	19990729	51	GL977610	8.1	20000	7.0		0.3	<T	43	31		38000	0.10		480	29	12		110		0.8	
McKellar River - mouth	1	1	462	19990729	55	GL977611	4.3	15000	5.3		0.2	<=W	38	15		36000	0.05		420	25	8	<T	86		0.4	<T
	1	1	462	19990729	55	GL977612	4.3	15090	5.7		0.2	<=W	35	14		38000	0.04	<T	410	24	9	<T	84		0.3	<T
	1	1	462	19990729	55	GL977613	4.3	15000	5.3		0.2	<=W	35	14		37000	0.05		410	24	9	<T	82		0.3	<T
North of Mission Bay Disposal	1	1	464	19990729	55	GL977601	8.1	15000	1.9		0.2	<=W	30	16		28000	0.05		240	20	4	<T	60		0.1	<=W
	1	1	464	19990729	55	GL977602	8.2	17000	2.8		0.2	<=W	33	18		30000	0.04	<T	260	22	7	<T	65		0.1	<=W
	1	1	464	19990729	55	GL977603	8.2	18000	3.1		0.2	<=W	35	19		32000	0.05		270	24	11		69		0.2	<T
Old Abitibi outfall (north of Bare Pt.)	1	1	466	19990729	55	GL977617	2.7	8700	1.4		0.2	<=W	42	2	<T	31000	0.01	<=W	240	18	7	<T	61		0.1	<=W
Provincial Paper (outside filtration bed)	1	1	465	19990729	51	GL977616	2.4	8100	2.5		0.4	<T	41	29		3200	0.48		34	21	23		69		2.3	
	1	1	465	19990729	51	GL977619	2.4	13000	1.8		0.8	<T	20	38		2300	0.97		25	6	24		110		3.7	
	1	1	465	19990729	51	GL977620	2.4	17000	4.4		1.6		66	68		7200	5.5**		78	29	30		170		4.7**	
Welcome Island - Index Station	1	1	284	19990730	51	GL977801	17.1	27000			1.2		87	68		45000**	0.45		780	44	35		170		1.5	
	1	1	284	19990730	51	GL977802	17.1	27000			1.3		85	64		44000**	0.45		830	43	32		160		1.4	
	1	1	284	19990730	51	GL977803	17.2	24000			0.8	<T	59	58		41000**	0.43		730	39	28		140		1.5	
	1	1	284	19990730	51	GL977804	17.2	28000			1.3		84	64		44000**	0.50		650	43	44		160			
	1	1	284	19990730	51	GL977805	17.1	28000			1.4		73	69		45000**	0.38		700	48	34		180			
Peninsula Harbour																										
Beatty Cove - Index Station	1	1	289	19990804	51	GL977826	19	10000			0.6	<T	41	31		20000	0.52		380	20	13		73		1.1	
	1	1	289	19990804	51	GL977827	19.3	11000			0.6	<T	48	31		21000	0.78		400	20	10		73		1.1	
	1	1	289	19990804	51	GL977828	109.2	10000			0.7	<T	40	30		19000	0.84		350	20	11		73		1.2	
	1	1	289	19990804	51	GL977829	19.3	11000			0.9	<T	42	33		20000	0.66		350	21	13		74			
	1	1	289	19990804	51	GL977830	19.3	10000			0.8	<T	41	29		20000	0.65		330	21	13		72			
Jellicoe Cove - Near wharf	1	1	276	19990804	51	GL977654	6.7	6600	2.9		0.4	<T	39	21		16000	17.0**		180	21	13		100		3.2	
	1	1	276	19990804	51	GL977655	6.7	6400	2.9		0.3	<T	33	15		15000	8.4**		180	18	10		94		3.1	
	1	1	276	19990804	51	GL977656	6.7	6200	3.0		0.5	<T	34	17		15000	21.0**		180	19	9	<T	90		4.0	
Jellicoe Cove - Near wharf	1	1	279	19990804	55	GL977657	3.1	30000	2.2		0.2	<=W	78	34		38000	4.0**		570	42	13		88		2.1	
	1	1	279	19990804	55	GL977658	3.1	25000	4.1		0.2	<=W	66	28		34000	3.9**		530	35	12		75		1.8	
	1	1	279	19990804	55	GL977659	3.1	34000	5.9		0.2	<=W	68	38		45000**	3.0**		610	48	18		100		2.0	
NE side of Hawkins Island (split sample)	1	1	468	19990804	55	GL977650	39.3	11000	4.2		0.4	<T	43	32		20000	0.88		480	21	14		68		1.8	
(split sample)	1	1	468	19990804	55	GL977651	39.3	11000	4.4		0.4	<T	43	32		20000	1.20		480	21	13		69		2.4	
	1	1	468	19990804	51	GL977652	40	10000	4.2		0.5	<T	42	31		19000	1.30		410	22	16		68		0.4	<T
	1	1	468	19990804	51	GL977653	38.4	10000	4.6		0.5	<T	42	32		20000	1.00		470	22	18		68		2.0	
SW of Peninsula	1	1	469	19990804	55	GL977648	30.8	6600	0.9	<T	0.2	<=W	30	6		18000	0.07		230	16	6	<T	24	<T	1.7	
	1	1	469	19990804	55	GL977649	41.2	8300	0.8	<T	0.2	<=W	35	6		14000	0.07		290	15	2	<=W	23	<T	1.3	
STP - 500 m S	1	1	409	19990804	51	GL977647	4.9	6000	0.8	<T	0.2	<=W	30	5		12000	0.04	<T	170	13	2	<=W	19	<T	1.0	
Lowest Effect Level (ug/g)									**6**		**0.6**		**26**	**16**		**2%**	**0.2**		**460**	**16**	**31**		**120**		**550**	
Severe Effect Level (ug/g) **									**33**		**10**		**110**	**110**		**4%**	**2**		**1100**	**75**	**250**		**820**		**4800**	
Background - Great Lakes pre-colonial sediment horizon, Persaud et al. (1992)									**4.2**		**1.1**		**31**	**25**		**3.1%**	**0.1**		**400**	**31**	**23**		**65**			
Background - Lake Superior pre-colonial sediment horizon-depositional basin, Mudroch et al. (1988) (n=1)											**0.4-0.7**		**26.1-73.1**	**30-84**			**0.04-0.68**			**24.4-66.8**	**20.5-68**		**53-137.1**			

<W no measurable response

<T measurable trace amount, interpret with caution

Table 3: Metal concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Total Phosphorus mg/g	Barium ug/g	Beryllium ug/g	RMK	Calcium ug/g	Cobalt ug/g	RMK	Magnesium ug/g	Molybdenum ug/g	RMK	Strontium ug/g	Titanium ug/g	Vanadium ug/g	LOI (mg/g)	RMK	TOC (mg/g)	RMK	Gravel %	RMK	Sand %	Silt & Clay %	RMK	Clay %	Silt %	Sand %	RMK
Thunder Bay																													
Kam R. at Mission River	1	1	802	1.0	120	0.6	<T	14000	15		14000	0.5	<=W	31	1100	79	62		22		6.1		50	44					
(split sample)	1	1	802	1.2	140	0.7	<T	15000	15		15000	0.5	<=W	33	1300	88	67		26		1.2		36	63					
(split sample)	1	1	802	1.1	140	0.6	<T	14000	15		14000	0.5	<=W	32	1200	83	67		20		0.18		32	68					
	1	1	802	1.1	120	0.7	<T	14000	15		14000	0.6	<T	31	1300	86	62		24		2.1		44	54					
Kam River - mouth	1	1	463	0.7	65	0.5	<=W	9700	11		7600	0.5	<=W	28	1600	110	24		10		0		73	27					
	1	1	463	0.5	65	0.5	<=W	9900	11		7700	0.5	<=W	27	1500	110	25		12		0		69	31					
	1	1	463	0.7	60	0.5	<=W	8700	10		7000	0.5	<=W	24	1400	110	24		9		0		68	32					
Mission River - mouth	1	1	176	0.8	82	0.5	<=W	12000	12		9400	0.5	<=W	31	1400	100	34		11		0		46	54					
	1	1	176	0.8	90	0.5	<=W	12000	13		10000	0.5	<=W	33	1500	110	38		15		0		42	58					
	1	1	176	0.8	89	0.5	<=W	12000	12		10000	0.5	<=W	33	1500	110	36		10		0		45	55					
McKellar River - mouth	1	1	462	0.6	59	0.5	<=W	8800	11		6600	0.5	<=W	25	1500	110	21		8		0		75	25					
	1	1	462	0.4	57	0.5	<=W	8600	11		6300	0.5	<=W	25	1500	110	19		9		0		76	24					
	1	1	462	0.5	56	0.5	<=W	8700	11		6200	0.5	<=W	25	1500	110	18		9		0		78	23					
North of Mission Bay Disposal	1	1	464	0.8	56	0.5	<=W	8300	8.5		5900	0.5	<=W	26	1400	91	17		6		0.3		56	43					
	1	1	464	0.6	64	0.5	<=W	9400	9.6		6400	0.5	<=W	29	1500	100	19		5		0.15		42	58					
	1	1	464	0.6	69	0.5	<=W	9700	10		6700	0.5	<=W	30	1600	100	21		6		0.28		42	58					
Old Abitibi outfall (north of Bare Pt.)	1	1	466	0.5	24	0.5	<=W	6900	9.4		3100	0.5	<=W	20	2800	250	2.7		1	<=W	0		97	3.2					
Provincial Paper (outside filtration bed)	1	1	465	0.6	20	0.5	<=W	2200	2	<T	1600	0.5	<=W	8	180	19	710		380**			IIS	IIS		IIS				
	1	1	465	0.9	23	0.5	<=W	1400	1.6	<T	1200	0.5	<=W	11	170	22	520		260**			IIS	IIS		IIS				
	1	1	465	1.1	43	0.5	<=W	3600	4.2		3700	1.1	<T	15	410	38	360		180**		3.9		65	31					
Welcome Island - Index Station	1	1	284	0.9															28							35.7	63	1	<=W
	1	1	284	0.9															31							33.2	62	5	
	1	1	284	0.8															27							29.4	63	8	
	1	1	284																34							33.1	62	4	<T
	1	1	284																29							37.7	62	1	<=W
Peninsula Harbour																													
Beatty Cove - Index Station	1	1	289	0.7															34							14.9	72	14	
	1	1	289	0.7															26							15.3	72	13	
	1	1	289	0.6															36							13.9	70	16	
	1	1	289																28							14.5	71	14	
	1	1	289																23							14	70	16	
Jellicoe Cove - Near wharf	1	1	276	0.5	75	0.5	<=W	30000	5.7		13000	1.1	<T	32	890	44	95		66		0.04		35	65					
	1	1	276	0.5	44	0.5	<=W	17000	5.4		10000	0.5	<=W	23	930	44	86		1	<=W	0.03		44	56					
	1	1	276	0.5	58	0.5	<=W	24000	4.8		11000	0.9	<T	27	860	41	82		71		0		37	63					
Jellicoe Cove - Near wharf	1	1	279	0.8	240	1.1	<T	63000	16		22000	0.5	<=W	61	1400	73	35		8		0		66	34					
	1	1	279	0.8	200	0.9	<T	67000	13		22000	0.5	<=W	60	1500	68	31		17		0.15		66	34					
	1	1	279	0.7	310	1.3	<T	45000	18		22000	0.5	<=W	53	1700	88	36		11		0.11		68	32					
NE side of Hawkins Island (split sample)	1	1	468	0.7	55	0.5	<=W	26000	7.2		18000	0.6	<T	31	1200	43	39		19		0.14		22	78					
(split sample)	1	1	468	0.7	57	0.5	<=W	26000	6.9		18000	0.6	<T	31	1200	43	39		31		0.03		24	76					
	1	1	468	0.7	54	0.5	<=W	26000	7		18000	0.5	<=W	29	1100	42	40		32		0.04		23	77					
	1	1	468	0.7	54	0.5	<=W	26000	7.4		18000	0.5	<=W	29	1200	42	40		22		0.19		25	75					
SW of Peninsula	1	1	469	0.4	22	0.5	<=W	9500	4.6		6400	0.5	<=W	25	1100	42	3.8		1	<=W	0		94	6.2					
	1	1	469	0.3	20	0.5	<=W	8500	4.3		6300	0.5	<=W	23	1000	33	2.8		1	<=W	0		93	6.6					
STP - 500 m S	1	1	409	0.3	20	0.5	<=W	12000	3.7		5800	0.5	<=W	27	890	29	1.2	<T	1	<=W	0		97	3.5					
Lowest Effect Level (ug/g)				600															1%										
Severe Effect Level (ug/g) **				2000															10%										
Background - Great Lakes pre-colonial sediment horizon, Persaud et al. (1992)																													
Background - Lake Superior pre-colonial sediment horizon-depositional basin, Mudroch et al. (1988) (n=1)																													

<W no measurable response
<T measurable trace amount, interpret with caution

Table 4 : Concentrations of chlorinated organic compounds in sediment collected from Thunder Bay and Peninsula Harbour, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Hexa-chlorobutadiene ng/g (dry wt)	RMK	123 tri-chlorobenzene ng/g (dry wt)	PMK	1234-tetra chlorobenzene ng/g (dry wt)	RMK	1235-tetra chlorobenzene ng/g (dry wt)	RMK	124-tri chlorobenzene ng/g (dry wt)	RMK
Thunder Bay																	
Kam R at Mission River	1	1	802	19990729	55	GL977604	8.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
(split sample)	1	1	802	19990729	55	GL977605	8.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
(split sample)	1	1	802	19990729	55	GL977606	8.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	802	19990729	55	GL977607	8.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Kam River - mouth	1	1	463	19990729	55	GL977614	8.8	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	463	19990729	55	GL977615	8.9	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	463	19990729	51	GL977616	9.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Mission River - mouth	1	1	176	19990729	51	GL977608	8.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	176	19990729	51	GL977609	8.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	176	19990729	51	GL977610	8.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
McKellar River - mouth	1	1	462	19990729	55	GL977611	4.3	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	462	19990729	55	GL977612	4.3	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	462	19990729	55	GL977613	4.3	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
North of Mission Bay Disposal	1	1	464	19990729	55	GL977601	6.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	464	19990729	55	GL977602	6.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	464	19990729	55	GL977603	6.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Old Abitibi outfall (north of Bare Pt)	1	1	466	19990729	55	GL977617	2.7	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Provincial Paper (outside filtration bed)	1	1	465	19990729	51	GL977618	2.4	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	465	19990729	51	GL977619	2.4	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	465	19990729	51	GL977620	2.4	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Welcome Island - Index Station	1	1	284	19990730	51	GL977801	17.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	284	19990730	51	GL977802	17.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	284	19990730	51	GL977803	17.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Peninsula Harbour																	
Beatty Cove - Index Station	1	1	289	19990804	51	GL977826	19	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	289	19990804	51	GL977827	19.3	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	289	19990804	51	GL977828	109.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
Jellicoe Cove - Near wharf	1	1	276	19990804	51	GL977654	6.7	1	<=W	2	<=W	1	<=W	26		6	<T
	1	1	276	19990804	51	GL977655	6.7	1	<=W	2	<=W	1	<=W	33		8	<T
	1	1	276	19990804	51	GL977656	6.7	1	<=W	2	<=W	1	<=W	33		6	<T
Jellicoe Cove - Near wharf	1	1	279	19990804	55	GL977657	3.1	1	<=W	2	<=W	1	<=W	2	<T	2	<=W
	1	1	279	19990804	55	GL977658	3.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	279	19990804	55	GL977659	3.1	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
NE side of Hawkins Island (split sample)	1	1	468	19990804	55	GL977650	39.3	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
(split sample)	1	1	468	19990804	55	GL977651	39.3	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	468	19990804	51	GL977652	40	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	468	19990804	51	GL977653	39.4	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
SW of Peninsula	1	1	469	19990804	55	GL977648	30.8	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
	1	1	469	19990804	55	GL977649	41.2	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W
STP - 500 m S	1	1	409	19990804	51	GL977647	4.9	1	<=W	2	<=W	1	<=W	1	<=W	2	<=W

<W no measurable response

<T measurable trace amount, interpret with caution

Table 4 : Concentrations of chlorinated organic compounds in sediment collected from Thunder Bay and Peninsula Harbour, 1999

Station Description	Station Number			1245-tetra chlorobenzene ng/g (dry wt)	RMK	135-tri chlorobenzene ng/g (dry wt)	RMK	Hexa-chlorobenzene ng/g (dry wt.)	RMK	Hexa-chloroethane ng/g (dry wt)	RMK	Octa-chlorostyrene ng/g (dry wt)	RMK	Penta-chlorobenzene ng/g (dry wt.)	RMK	236-tri chlorotoluene ng/g (dry wt)	RMK	245-tri chlorotoluene ng/g (dry wt)	RMK	2,6-dichloro-benzyl chloride ng/g (dry wt)	RMK
Thunder Bay																					
Kam R. at Mission River	1	1	802	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
(split sample)	1	1	802	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
(split sample)	1	1	802	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	802	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Kam River - mouth	1	1	463	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	463	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	463	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Mission River - mouth	1	1	176	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	176	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	176	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
McKellar River - mouth	1	1	462	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	462	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	462	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
North of Mission Bay Disposal	1	1	464	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	464	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	464	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Old Abitibi outfall (north of Bare Pt.)	1	1	466	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Provincial Paper (outside filtration bed)	1	1	465	1	<=W	2	<=W	2	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	465	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	465	1	<=W	2	<=W	2	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Welcome Island - Index Station	1	1	284	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	284	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	284	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Peninsula Harbour																					
Beatty Cove - Index Station	1	1	289	1	<=W	2	<=W	5	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	289	1	<=W	2	<=W	6	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	289	1	<=W	2	<=W	6	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
Jellicoe Cove - Near wharf	1	1	276	1	<=W	28		30		3	<T	1	<=W	10		1	<=W	1	<=W	1	<=W
	1	1	276	1	<=W	28		60		14		1	<=W	32		1	<=W	1	<=W	1	<=W
	1	1	276	1	<=W	28		37		1	<=W	1	<=W	14		1	<=W	1	<=W	1	<=W
Jellicoe Cove - Near wharf	1	1	279	1	<=W	6	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	279	1	<=W	4	<T	2	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	279	1	<=W	4	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
NE side of Hawkins Island (split sample)	1	1	468	1	<=W	2	<=W	8	<T	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
(split sample)	1	1	468	1	<=W	2	<=W	8	<T	1	<=W	1	<=W	3	<T	1	<=W	1	<=W	1	<=W
	1	1	468	1	<=W	2	<=W	10		1	<=W	1	<=W	2	<T	1	<=W	1	<=W	1	<=W
	1	1	468	1	<=W	2	<=W	9	<T	1	<=W	1	<=W	2	<T	1	<=W	1	<=W	1	<=W
SW of Peninsula	1	1	469	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
	1	1	469	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W
STP - 500 m S	1	1	409	1	<=W	2	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W	1	<=W

<W no measurable response

<T measurable trace amount, interpret with caution

Table 5: Concentrations of organochlorine pesticides and total PCBs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Aldrin ng/g	RMK	α-BHC ng/g	RMK	β-BHC ng/g	RMK	γ-BHC ng/g	RMK	α-Chlordane ng/g	RMK	γ-Chlordane ng/g	RMK	Dieldrin ng/g	RMK	Methoxychlor ng/g	RMK
Spanish River																							
Mouth of Spanish River	14	1	400	19990810	55	GL977680	2.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	400	19990810	51	GL977681	2.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	400	19990810	51	GL977682	0.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Index Station	14	1	39	19990811	51	GL977851	9.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	39	19990811	51	GL977852	9.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	39	19990811	51	GL977853	9.9	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	39	19991019	54	GL953010	7.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Whalesback Channel	14	1	401	19990810	51	GL977670	22.7	1	<=W	1	<=W	4	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	401	19990810	51	GL977671	22.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	401	19990810	51	GL977672	22.7	1	<=W	1	<=W	2	<T	1	<=W	4	<T	2	<=W	2	<=W	5	<=W
Whalesback Channel (near Greenway Island)	14	1	209	19990810	51	GL977667	14.9	1	<=W	1	<=W	2	<T	1	<=W	4	<T	2	<=W	2	<=W	5	<=W
	14	1	209	19990810	51	GL977668	14.9	1	<=W	1	<=W	2	<T	1	<=W	4	<T	2	<=W	2	<=W	5	<=W
	14	1	209	19990810	51	GL977669	15.6	1	<=W	1	<=W	5	<T	1	<=W	4	<T	2	<=W	2	<=W	5	<=W
Aird Bay	14	1	402	19990810	51	GL977673	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	402	19990810	51	GL977674	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	402	19990810	55	GL977675	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	402	19990810	55	GL977676	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Near Shanly Island	14	1	403	19990810	51	GL977677	11.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	403	19990810	51	GL977678	11.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	403	19990810	51	OL977679	2.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Near Little Detroit	14	1	404	19990810	51	GL977683	33.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	404	19990810	51	GL977684	33.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	14	1	404	19990810	51	GL977685	33.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Nipigon Bay																							
Downstream of Nipigon R	1	1	458	19990731	51	GL977631	28.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	458	19990731	51	GL977632	28.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	458	19990731	51	GL977633	28.6	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Nipigon Bay - 30 m S of mill outfall	1	1	459	19990731	51	GL977628	2.8	1	<=W	1	<=W	2	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	459	19990731	51	GL977629	3.0	1	<=W	1	<=W	3	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	459	19990731	55	GL977630	3.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Nipigon Bay - NW of Five Mile Pt	1	1	461	19990731	51	GL977624	21.6	1	<=W	1	<=W	2	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	461	19990731	51	GL977625	21.6	1	<=W	1	<=W	2	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	461	19990731	55	OL977626	21.6	1	<=W	1	<=W	6	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	461	19990731	55	GL977627	21.6	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Nipigon Bay - Index Station	1	1	286	19990731	51	GL977811	14.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	286	19990731	51	GL977812	14.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	286	19990731	51	GL977813	14.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	286	19991011	54	OL953003	12.2	1	<=W	1	<=W	2	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Nipigon Bay - West of Frog Island	1	1	869	19990731	51	GL977621	30.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	869	19990731	51	GL977622	30.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	869	19990731	51	GL977623	29.6	1	<=W	1	<=W	5	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W

Table 5: Concentrations of organochlorine pesticides and total PCBs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Aldrin ng/g	RMK	α-BHC ng/g	RMK	β-BHC ng/g	RMK	γ-BHC ng/g	RMK	α-Chlordane ng/g	RMK	γ-Chlordane ng/g	RMK	Dieldrin ng/g	RMK	Methoxychlor ng/g	RMK
Jackfish Bay																							
Blackbird Creek - mouth	1	1	701	19990802	55	GL977044	1.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	701	19990802	51	GL977045	1.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	701	19990802	51	GL977046	1.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Moberly Bay	1	1	702	19990802	51	GL977040	18.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	702	19990802	51	GL977041	18.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	702	19990802	55	GL977042	18.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	702	19990802	55	GL977043	18.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Downstream of Moberly Bay	1	1	710	19990802	51	GL977037	34.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	710	19990802	51	GL977038	31.5	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	710	19990802	51	GL977039	32.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Jackfish Bay	1	1	451	19990731	51	GL977034	41.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	451	19990731	51	GL977035	41.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	451	19990731	51	GL977036	40.6	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Jackfish Bay - Index Station	1	1	288	19990803	55	GL977821	18.4	1	<=W	1	<=W	5	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	288	19990803	55	GL977822	18.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	288	19990803	51	GL977823	18.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	288	19991011	54	GL05[illegible]	42.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Pic River																							
Pic River	1	1	20	19990805	51	GL977060	11.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	20	19990805	51	GL977061	11.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	20	19990805	51	GL977062	11.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Pic River - mouth	1	1	453	19990805	55	GL977063	11.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	453	19990805	55	GL977064	11.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	451	19990805	51	GL977065	11.6	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
	1	1	451	19990805	51	GL977066	12.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Pic River - South of mouth	1	1	454	19991015	51	GL055001	2.0	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Pic River - west of mouth	1	1	457	19991015	51	GL055002	2.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W
Lowest Effect Level (ug/g)														0.003		0.007		0.007		0.002			
Severe Effect Level (ug/g organic carbon)**														1		6		6		91			

<=W no measurable response

<T measurable trace amount, interpret with caution

Table 5: Concentrations of organochlorine pesticides and total PCBs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Endosulphan I ng/g	RMK	Endosulphan II ng/g	RMK	Endrin ng/g	RMK	Endosulphan Sulphate ng/g	RMK	Heptachlor Epoxide ng/g	RMK	Heptachlor ng/g	RMK	Mirex ng/g	RMK	Oxychlordane ng/g	RMK	o,p-DDT ng/g	RMK	p,p-DDD ng/g	RMK	p,p-DDE ng/g	RMK	p,p-DDT ng/g	RMK	Total PCB ng/g	RMK
Spanish River																													
Mouth of Spanish River	14	1	400	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	400	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	400	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Index Station	14	1	39	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	39	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	39	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	39	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	8	<T	5	<=W	5	<=W	3	<T	5	<=W	20	<=W
Whalesback Channel	14	1	401	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	12	<T	5	<=W	5	<=W	1	<=W	10	<T	20	<=W
	14	1	401	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	2	<T	5	<=W	8	<T	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	401	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	16	<T	5	<=W	5	<=W	1	<=W	15	<T	20	<=W
Whalesback Channel (near Greenway Island)	14	1	209	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	2	<T	5	<=W	6	<T	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	209	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	2	<T	5	<=W	4	<T	5	<=W	5	<=W	1	<=W	10	<T	20	<=W
	14	1	209	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	8	<T	5	<=W	5	<=W	1	<=W	10	<T	20	<=W
Aird Bay	14	1	402	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	402	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	402	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	402	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Near Shanly Island	14	1	403	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	403	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	403	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Near Little Detroit	14	1	404	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	404	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	14	1	404	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Nipigon Bay																													
Downstream of Nipigon R	1	1	458	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	458	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	458	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Nipigon Bay - 30 m S of mill outfall	1	1	459	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	2	<=W	5	<=W	5	<=W	10		5	<=W	120	<T
	1	1	459	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	2	<=W	5	<=W	5	<=W	9	<T	5	<=W	140	<T
	1	1	459	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	2	<=W	5	<=W	5	<=W	8	<T	5	<=W	200	
Nipigon Bay - NW of Five Mile Pt	1	1	461	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	80	<T
	1	1	461	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	5	<T	5	<=W	80	<T
	1	1	461	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	3	<T	5	<=W	2	<=W	5	<=W	5	<=W	4	<T	5	<=W	100	<T
	1	1	461	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	4	<T	5	<=W	2	<=W	5	<=W	5	<=W	4	<T	5	<=W	100	<T
Nipigon Bay - Index Station	1	1	286	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	286	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	286	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	286	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	4	<T	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Nipigon Bay - West of Frog Island	1	1	869	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	869	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	869	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W

Table 5: Concentrations of organochlorine pesticides and total PCBs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Endosulphan I ng/g	RMK	Endosulphan II ng/g	RMK	Endrin ng/g	RMK	Endosulphan Sulphate ng/g	RMK	Heptachlor Epoxide ng/g	RMK	Heptachlor ng/g	RMK	Mirex ng/g	RMK	Oxychlordane ng/g	RMK	o'p-DDT ng/g	RMK	p'p-DDD ng/g	RMK	p'p-DDE ng/g	RMK	p'p-DDT ng/g	RMK	Total PCB ng/g	RMK
Jackfish Bay																													
Blackbird Creek - mouth	1	1	701	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	701	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	701	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Moberly Bay	1	1	702	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	702	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	702	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	702	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Downstream of Moberly Bay	1	1	710	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	710	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	710	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Jackfish Bay	1	1	451	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	451	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	451	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Jackfish Bay - Index Station	1	1	288	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	288	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	288	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	288	2	<=W	4	<=W	8	<T	4	<=W	1	<=W	1	<=W	5	<=W	10	<T	5	<=W	5	<=W	2	<T	45	<T	20	<=W
Pic River																													
Pic River	1	1	20	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	20	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	20	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Pic River - mouth	1	1	453	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	453	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	453	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	453	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Pic River - South of mouth	1	1	454	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Pic River - west of mouth	1	1	457	2	<=W	4	<=W	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Lowest Effect Level (ug/g)												0.005												0.005		0.006		0.07	
Severe Effect Level (ug/g organic carbon) **												5												19		71		130	

<W no measurable response
<T measurable trace amount, interpret with caution

Table 5: Concentrations of organochlorine pesticides and total PCBs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Aldrin ng/g	RMK	α-BHC ng/g	RMK	β-BHC ng/g	RMK	γ-BHC ng/g	RMK	α-Chlordane ng/g	RMK	γ-Chlordane ng/g	RMK	Dieldrin ng/g	RMK	Methoxychlor ng/g	RMK	Endosulphan I ng/g	RMK	Endosulphan II ng/g	RMK
Thunder Bay																											
Kam R. at Mission River	1	1	802	19990729	55	GL977604	8.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	6	<T	2	<=W	5	<=W	2	<=W	4	<=W
(split sample)	1	1	802	19990729	55	GL977605	8.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	6	<T	2	<=W	5	<=W	2	<=W	4	<=W
(split sample)	1	1	802	19990729	55	GL977606	8.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	6	<T	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	802	19990729	55	GL977607	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	6	<T	2	<=W	5	<=W	2	<=W	4	<=W
Kam River - mouth	1	1	463	19990729	55	GL977614	8.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	6	<T	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	463	19990729	55	GL977615	8.9	1	<=W	1	<=W	1	<=W	2	<T	2	<=W	8	<T	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	463	19990729	51	GL977616	9.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	4	<T	2	<=W	5	<=W	2	<=W	4	<=W
Mission River - mouth	1	1	176	19990729	51	GL977608	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	176	19990729	51	GL977609	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	176	19990729	51	GL977610	8.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
McKellar River - mouth	1	1	462	19990729	55	GL977611	4.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	462	19990729	55	GL977612	4.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	462	19990729	55	GL977613	4.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
North of Mission Bay Disposal	1	1	464	19990729	55	GL977601	6.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	464	19990729	55	GL977602	6.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	464	19990729	55	GL977603	6.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
old Abitibi outfall (north of Bare Pt.)	1	1	466	19990729	55	GL977617	2.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
Provincial Paper (outside filtration bed)	1	1	465	19990729	51	GL977618	2.4	1	<=W	1	<=W	3	<T	1	<=W	2	<=W	4	<T	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	465	19990729	51	GL977619	2.4	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	465	19990729	51	GL977620	2.4	1	<=W	1	<=W	3	<T	3	<T	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
Welcome Island - Index Station	1	1	284	19990730	51	GL977801	17.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	284	19990730	51	GL977802	17.1	1	<=W	1	<=W	3	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	284	19990730	51	GL977803	17.2	1	<=W	1	<=W	5	<T	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
Peninsular Harbour																											
Beatty Cove - Index Station	1	1	289	19990804	51	GL977826	19	1	<=W	2	<T	1	<=W	1	<=W	2	<=W	4	<T	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	289	19990804	51	GL977827	19.3	1	<=W	2	<T	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	289	19990804	51	GL977828	109.2	1	<=W	3	<T	1	<=W	1	<=W	2	<=W	4	<T	2	<=W	5	<=W	2	<=W	4	<=W
Jellicoe Cove - Near wharf	1	1	276	19990804	51	GL977654	6.7	1	<=W	1	<=W	1	<=W	2	<T	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	276	19990804	51	GL977655	6.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	276	19990804	51	GL977656	6.7	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
Jellicoe Cove - Near wharf	1	1	279	19990804	55	GL977657	3.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	279	19990804	55	GL977658	3.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	279	19990804	55	GL977659	3.1	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
NE side of Hawkins Island (split sample)	1	1	468	19990804	55	GL977650	39.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
(split sample)	1	1	468	19990804	55	GL977651	39.3	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	468	19990804	51	GL977652	40	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	468	19990804	51	GL977653	39.4	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
SW of Peninsula	1	1	469	19990804	55	GL977648	30.8	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
	1	1	469	19990804	55	GL977649	41.2	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
STP - 500 m S	1	1	409	19990804	51	GL977647	4.9	1	<=W	1	<=W	1	<=W	1	<=W	2	<=W	2	<=W	2	<=W	5	<=W	2	<=W	4	<=W
Lowest Effect Level (ng/g)										5		5		3		7		7		2							
Severe Effect Level (ug/g organic carbon) **														1		6		6		91							

<W no measurable response

<T measurable trace amount, interpret with caution

Table 5: Concentrations of organochlorine pesticides and total PCBs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Endrin ng/g	RMK	Endosulphan Sulphate ng/g	RMK	Heptachlor Epoxide ng/g	RMK	Heptachlor ng/g	RMK	Mirex ng/g	RMK	Oxychlordane ng/g	RMK	o'p-DDT ng/g	RMK	p'p-DDD ng/g	RMK	p'p-DDE ng/g	RMK	p'p-DDT ng/g	RMK	Total PCB ng/g	RMK
Thunder Bay																									
Kam R. at Mission River	1	1	802	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	15	<T	40	<T
(split sample)	1	1	802	6	<T	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
(split sample)	1	1	802	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	802	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	100	<T
Kam River - mouth	1	1	463	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	4	<T	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	463	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	4	<T	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	463	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	4	<T	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Mission River - mouth	1	1	176	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	176	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	176	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	40	<T
McKellar River - mouth	1	1	462	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	462	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	462	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
North of Mission Bay Disposal	1	1	464	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	464	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	464	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
old Abitibi outfall (north of Bare Pt.)	1	1	466	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Provincial Paper (outside filtration bed)	1	1	465	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	4	<T	10	<T	40	<T
	1	1	465	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	12	<T	5	<=W	5	<=W	4	<T	10	<T	40	<T
	1	1	465	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	60	<T
Welcome Island - Index Station	1	1	284	6	<T	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	3	<T	5	<=W	60	P40
	1	1	284	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	4	<T	5	<=W	100	P40
	1	1	284	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	2	<T	5	<=W	40	P40
Peninsular Harbour																									
Beatty Cove - Index Station	1	1	289	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	4	<T	5	<=W	5	<=W	1	<=W	5	<=W	180	P40
	1	1	289	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	180	P40
	1	1	289	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	180	P40
Jellicoe Cove - Near wharf	1	1	276	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	180	<T
	1	1	276	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	6	<T	5	<=W	5	<=W	1	<=W	5	<=W	240	
	1	1	276	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	6	<T	5	<=W	5	<=W	1	<=W	5	<=W	200	
Jellicoe Cove - Near wharf	1	1	279	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	279	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	279	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
NE side of Hawkins Island (split sample)	1	1	468	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	80	<T
(split sample)	1	1	468	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	15	<T	100	<T
	1	1	468	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	80	<T
	1	1	468	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	80	<T
SW of Peninsula	1	1	469	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
	1	1	469	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
STP - 500 m S	1	1	409	4	<=W	4	<=W	1	<=W	1	<=W	5	<=W	2	<=W	5	<=W	5	<=W	1	<=W	5	<=W	20	<=W
Lowest Effect Level (ng/g)				3*				5												5		6		70	
Severe Effect Level (ug/g organic carbon) **								5												19		71		130	

<W no measurable response
<T measurable trace amount, interpret with caution

Table 6: PAH concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Acenaphthene ng/g (dry wt)	RMK	Acenaphthylene ng/g (dry wt)	RMK	Anthracene ng/g (dry wt)	RMK	Benzo(a) anthracene ng/g (dry wt)	RMK	Benzo(a) pyrene ng/g (dry wt)	RMK	Benzo(b) fluoranthene ng/g (dry wt)	RMK
Spanish River																			
Mouth of Spanish River	14	1	400	19990810	55	GL977680	2.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	400	19990810	51	GL977681	2.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	400	19990810	51	GL977682	0.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Index Station	14	1	39	19990811	51	GL977851	9.8	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	39	19990811	51	GL977852	9.8	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	39	19990811	51	GL977853	9.9	120		20	<=W	340		180		80	<T	80	<T
	14	1	39	19991019	54	GL953010	7.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Whalesback Channel	14	1	401	19990810	51	GL977670	22.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	401	19990810	51	GL977671	22.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	401	19990810	51	GL977672	22.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
Whalesback Channel (near Greenway Island)	14	1	209	19990810	51	GL977667	14.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	100	
	14	1	209	19990810	51	GL977668	14.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
	14	1	209	19990810	51	GL977669	15.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
Aird Bay	14	1	402	19990810	51	GL977673	8.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
	14	1	402	19990810	51	GL977674	8.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	402	19990810	55	GL977675	8.1	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	40	<T
	14	1	402	19990810	55	GL977676	8.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
Near Shanty Island	14	1	403	19990810	51	GL977677	11.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	403	19990810	51	GL977678	11.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	14	1	403	19990810	51	GL977679	2.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Near Little Detroit	14	1	404	19990810	51	GL977683	33.7	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	100	
	14	1	404	19990810	51	GL977684	33.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	120	
	14	1	404	19990810	51	GL977685	33.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	60	<T
Nipigon Bay																			
Downstream of Nipigon R	1	1	458	19990731	51	GL977631	28.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	458	19990731	51	GL977632	28.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	458	19990731	51	GL977633	28.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Nipigon Bay - 30 m S of mill outfall	1	1	459	19990731	51	GL977628	2.8	20	<=W	20	<=W	20	<=W	80	<T	40	<=W	60	<T
	1	1	459	19990731	51	GL977629	3	20	<=W	20	<=W	20	<=W	80	<T	40	<=W	60	<T
	1	1	459	19990731	55	GL977630	3	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	40	<T
Nipigon Bay - NW of Five Mile Pt	1	1	461	19990731	51	GL977624	21.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	461	19990731	51	GL977625	21.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	461	19990731	55	GL977626	21.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	461	19990731	55	GL977627	21.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Nipigon Bay - Index Station	1	1	286	19990731	51	GL977811	14	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	286	19990731	51	GL977812	14	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	286	19990731	51	GL977813	14	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	286	19991011	54	GL953003	12.2	40	<T	20	<=W	40	<T	40	<T	40	<=W	20	<=W
Nipigon Bay - West of Frog Island	1	1	869	19990731	51	GL977621	30	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	869	19990731	51	GL977622	30	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	869	19990731	51	GL977623	29.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W

Table 6: PAH concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Acenaphthene ng/g (dry wt)	RMK	Acenaphthylene ng/g (dry wt)	RMK	Anthracene ng/g (dry wt)	RMK	Benzo(a) anthracene ng/g (dry wt)	RMK	Benzo(a) pyrene ng/g (dry wt)	RMK	Benzo(b) fluoranthene ng/g (dry wt)	RMK
Jackfish Bay																			
Blackbird Creek - mouth	1	1	701	19990802	55	GL977644	1.8	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	701	19990802	51	GL977645	1.8	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	701	19990802	51	GL977646	1.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Moberly Bay	1	1	702	19990802	51	GL977640	18.2	20	<=W	20	<=W	20	<=W	160		80	<T	180	
	1	1	702	19990802	51	GL977641	18.2	20	<=W	20	<=W	20	<=W	160		80	<T	140	
	1	1	702	19990802	55	GL977642	18.2	20	<=W	20	<=W	20	<=W	160		80	<T	140	
	1	1	702	19990802	55	GL977643	18.2	20	<=W	20	<=W	40	<T	180		80	<T	160	
Downstream of Moberly Bay	1	1	710	19990802	51	GL977637	34.2	20	<=W	20	<=W	20	<=W	80	<T	40	<=W	80	<T
	1	1	710	19990802	51	GL977638	31.5	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	40	<T
	1	1	710	19990802	51	GL977639	32	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
Jackfish Bay	1	1	451	19990731	51	GL977634	41.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	451	19990731	51	GL977635	41	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
	1	1	451	19990731	51	GL977636	40.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
Jackfish Bay - Index Station	1	1	288	19990803	55	GL977821	18.4	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	288	19990803	55	GL977822	18.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	288	19990803	51	GL977823	18.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	288	19991013	54	GL953005	42.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Pic River																			
Pic River	1	1	20	19990805	51	GL977660	11.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	20	19990805	51	GL977661	11.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	20	19990805	51	GL977662	11.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Pic River - mouth	1	1	453	19990805	55	GL977663	11.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	453	19990805	55	GL977664	11.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	453	19990805	51	GL977665	11.6	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	453	19990805	51	GL977666	12.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Pic River - South of mouth	1	1	454	19991015	51	GL955001	2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Pic River - west of mouth	1	1	457	19991015	51	GL955002	2.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Lowest Effect Level (ug/g)																			
Severe Effect Level (ug/g organic carbon) **																			

<W no measurable response

<T measurable trace amount, interpret with caution

Table 6: PAH concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Benzo(k) fluoranthene ng/g (dry wt)	RMK	Chrysene ng/g (dry wt)	RMK	Dibenzo(ah) anthracene ng/g (dry wt)	RMK	Fluoranthene ng/g (dry wt)	RMK	Fluorene ng/g (dry wt)	RMK	Benzo(g,h,i) perylene ng/g (dry wt)	RMK	Indeno(1,2,3-cd) pyrene ng/g (dry wt)	RMK	Naphthalene ng/g (dry wt)	RMK	Phenanthrene ng/g (dry wt)	RMK	Pyrene ng/g (dry wt)	RMK	Total PAHs ng/g (dry wt)
Spanish River																								
Mouth of Spanish River	14	1	400	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	14	1	400	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	14	1	400	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Index Station	14	1	39	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	14	1	39	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	120
	14	1	39	80	<T	200		40	<=W	880		200		40	<=W	40	<=W	20	<=W	1200		600		3960
	14	1	39	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Whalesback Channel	14	1	401	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	14	1	401	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	14	1	401	20	<=W	20	<=W	40	<=W	20	<=W	40	<T	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	80
Whalesback Channel (near Greenway Island)	14	1	209	20	<=W	40	<T	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	180
	14	1	209	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	40
	14	1	209	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	40
Aird Bay	14	1	402	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	120
	14	1	402	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	80
	14	1	402	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	60	<T	180
	14	1	402	20	<=W	20	<=W	40	<=W	40	<T	40	<T	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	160
Near Shanly Island	14	1	403	20	<=W	20	<=W	40	<=W	20	<=W	40	<T	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	40
	14	1	403	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	14	1	403	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Near Little Detroit	14	1	404	60	<T	60	<T	40	<=W	80	<T	40	<T	80	<T	80	<T	40	<T	40	<T	60	<T	640
	14	1	404	20	<=W	40	<T	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	240
	14	1	404	40	<T	40	<T	40	<=W	40	<T	40	<T	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	260
Nipigon Bay																								
Downstream of Nipigon R	1	1	458	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	458	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	458	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Nipigon Bay - 30 m S of mill outfall	1	1	459	40	<T	60	<T	40	<=W	180		20	<=W	40	<=W	40	<=W	20	<=W	120		140		680
	1	1	459	40	<T	80	<T	40	<=W	180		20	<=W	40	<=W	40	<=W	20	<=W	140		160		740
	1	1	459	20	<=W	40	<T	40	<=W	140		20	<=W	40	<=W	40	<=W	20	<=W	120		120		500
Nipigon Bay - NW of Five Mile Pt	1	1	461	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	80
	1	1	461	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	80
	1	1	461	20	<=W	40	<T	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	60	<T	200
	1	1	461	20	<=W	20	<=W	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	140
Nipigon Bay - Index Station	1	1	286	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	286	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	286	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	60
	1	1	286	20	<=W	40	<T	40	<=W	80	<T	40	<T	40	<=W	40	<=W	20	<=W	180		120		580
Nipigon Bay - West of Frog Island	1	1	869	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	869	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	869	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0

Table 6: PAH concentrations in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Benzo(k) fluoranthene ng/g (dry wt.)	RMK	Chrysene ng/g (dry wt.)	RMK	Dibenzo(ah) anthracene ng/g (dry wt.)	RMK	Fluoranthene ng/g (dry wt.)	RMK	Fluorene ng/g (dry wt.)	RMK	Benzo(g h,i) perylene ng/g (dry wt.)	RMK	Indeno(1 2 3-cd) pyrene ng/g (dry wt.)	RMK	Naphthalene ng/g (dry wt.)	RMK	Phenanthrene ng/g (dry wt.)	RMK	Pyrene ng/g (dry wt.)	RMK	Total PAHs ng/g (dry wt.)
Jackfish Bay																								
Blackbird Creek - mouth	1	1	701	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	701	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	701	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Moberly Bay	1	1	702	80	<T	300		40	<=W	440		20	<=W	40	<=W	40	<=W	20	<=W	280		340		1860
	1	1	702	60	<T	280		40	<=W	400		20	<=W	40	<=W	40	<=W	20	<=W	280		300		1700
	1	1	702	60	<T	260		40	<=W	400		20	<=W	40	<=W	40	<=W	20	<=W	280		300		1680
	1	1	702	80	<T	280		40	<=W	460		20	<=W	40	<=W	40	<=W	20	<=W	320		340		1940
Downstream of Moberly Bay	1	1	710	40	<T	100		40	<=W	180		20	<=W	40	<=W	40	<=W	20	<=W	80	<T	160		720
	1	1	710	20	<=W	60	<T	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	60	<T	280
	1	1	710	20	<=W	40	<T	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	200
Jackfish Bay	1	1	451	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	451	20	<=W	40	<T	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	220
	1	1	451	20	<=W	40	<T	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	200
Jackfish Bay - Index Station	1	1	288	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	288	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	288	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	288	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	120
Pic River																								
Pic River	1	1	20	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	20	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	40	<T	20	<=W	20	<=W	40
	1	1	20	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Pic River - mouth	1	1	453	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	453	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	453	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	453	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Pic River - South of mouth	1	1	454	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Pic River - west of mouth	1	1	457	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Lowest Effect Level (ug/g)																								2
Severe Effect Level (ug/g organic carbon) **																								11 000

<W no measurable response

<T measurable trace amount, interpret with caution

Table 6: Concentration of PAHs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Date YYYYMMDD	SMP TYPE	Field Sample No	Sample Depth (m)	Acenaphthene ng/g (dry wt)	RMK	Acenaphthylene ng/g (dry wt)	RMK	Anthracene ng/g (dry wt)	RMK	Benzo(a) anthracene ng/g (dry wt)	RMK	Benzo(a) pyrene ng/g (dry wt)	RMK	Benzo(b) fluoranthene ng/g (dry wt)	RMK
Thunder Bay																			
Kam R at Mission River	1	1	802	19990729	55	GL977604	8.2	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	20	<=W
(split sample)	1	1	802	19990729	55	GL977605	8.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
(split sample)	1	1	802	19990729	55	GL977606	8.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	802	19990729	55	GL977607	8.1	20	<=W	60	<T	60	<T	80	<T	40	<=W	60	<T
Kam River - mouth	1	1	463	19990729	55	GL977614	8.8	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	463	19990729	55	GL977615	8.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	463	19990729	51	GL977616	9.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	40	<T
Mission River - mouth	1	1	176	19990729	51	GL977608	8.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	176	19990729	51	GL977609	8.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	176	19990729	51	GL977610	8.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
McKellar River - mouth	1	1	462	19990729	55	GL977611	4.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	462	19990729	55	GL977612	4.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	462	19990729	55	GL977613	4.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
North of Mission Bay Disposal	1	1	464	19990729	55	GL977601	6.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	464	19990729	55	GL977602	6.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	464	19990729	55	GL977603	6.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
old Abitibi outfall (north of Bare Pt.)	1	1	466	19990729	55	GL977617	2.7	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Provincial Paper (outside filtration bed)	1	1	465	19990729	51	GL977618	2.4	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	465	19990729	51	GL977619	2.4	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	465	19990729	51	GL977620	2.4	20	<=W	20	<=W	40	<T	60	<T	40	<=W	40	<T
Welcome Island - Index Station	1	1	284	19990730	51	GL977801	17.1	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	60	<T
	1	1	284	19990730	51	GL977802	17.1	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	60	<T
	1	1	284	19990730	51	GL977803	17.2	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	40	<T
Peninsula Harbour																			
Beatty Cove - Index Station	1	1	289	19990804	51	GL977826	19	20	<=W	20	<=W	20	<=W	40	<T	40	<=W	40	<T
	1	1	289	19990804	51	GL977827	19.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	289	19990804	51	GL977828	109.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Jellicoe Cove - Near wharf	1	1	276	19990804	51	GL977654	6.7	20	<=W	20	<=W	80	<T	260		200		180	
	1	1	276	19990804	51	GL977655	6.7	20	<=W	20	<=W	100		240		200		160	
	1	1	276	19990804	51	GL977656	6.7	40	<T	20	<=W	120		300		240		220	
Jellicoe Cove - Near wharf	1	1	279	19990804	55	GL977657	3.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	279	19990804	55	GL977658	3.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	279	19990804	55	GL977659	3.1	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
NE side of Hawkins Island (split sample)	1	1	468	19990804	55	GL977650	39.3	20	<=W	20	<=W	40	<T	40	<T	40	<=W	40	<T
(split sample)	1	1	468	19990804	55	GL977651	39.3	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	468	19990804	51	GL977652	40	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	468	19990804	51	GL977653	39.4	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
SW of Peninsula	1	1	469	19990804	55	GL977648	30.8	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
	1	1	469	19990804	55	GL977649	41.2	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
STP - 500 m S	1	1	409	19990804	51	GL977647	4.9	20	<=W	20	<=W	20	<=W	20	<=W	40	<=W	20	<=W
Lowest Effect Level (ng/g)												220		320		370			
Severe Effect Level (ug/g organic carbon) **																			

<W no measurable response

<T measurable trace amount, interpret with caution

Table 6: Concentration of PAHs in sediment collected from Lake Superior and the Spanish River, 1999

Station Description	Station Number			Benzo(k) fluoranthene ng/g (dry wt.)	RMK	Chrysene ng/g (dry wt.)	RMK	Dibenzo(ah) anthracene ng/g (dry wt.)	RMK	Fluoranthene ng/g (dry wt.)	RMK	Fluorene ng/g (dry wt.)	RMK	Benzo(g h i) perylene ng/g (dry wt.)	RMK	Indene(1,2,3-cd) pyrene ng/g (dry wt.)	RMK	Naphthalene ng/g (dry wt.)	RMK	Phenanthrene ng/g (dry wt.)	RMK	Pyrene ng/g (dry wt.)	RMK	Total PAHs ng/g (dry wt.)
Thunder Bay																								
Kam R. at Mission River	1	1	802	20	<=W	40	<T	40	<=W	120		20	<=W	40	<=W	40	<=W	40	<T	80	<T	80	<T	400
(split sample)	1	1	802	20	<=W	20	<=W	40	<=W	80	<T	20	<=W	40	<=W	40	<=W	40	<T	60	<T	60	<T	240
(split sample)	1	1	802	20	<=W	20	<=W	40	<=W	80	<T	20	<=W	40	<=W	40	<=W	40	<T	60	<T	60	<T	240
	1	1	802	40	<T	80	<T	40	<=W	320		40	<T	40	<=W	40	<=W	60	<T	240		220		1260
Kam River - mouth	1	1	463	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	120
	1	1	463	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	40	<T	60	<T	40	<T	180
	1	1	463	20	<=W	20	<=W	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	180
Mission River - mouth	1	1	176	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	20	<=W	80
	1	1	176	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	120
	1	1	176	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	120
McKellar River - mouth	1	1	462	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	462	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	462	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
North of Mission Bay Disposal	1	1	464	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	464	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	40
	1	1	464	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
old Abitibi outfall (north of Bare Pt.)	1	1	466	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Provincial Paper (outside filtration bed)	1	1	465	20	<=W	20	<=W	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	60	<T	80	<T	40	<T	240
	1	1	465	20	<=W	40	<T	40	<=W	100		40	<T	40	<=W	40	<=W	40	<T	100		80	<T	400
	1	1	465	40	<T	80	<T	40	<=W	300		20	<=W	40	<=W	40	<=W	120		240		240		1160
Welcome Island - Index Station	1	1	284	40	<T	60	<T	40	<=W	140		20	<=W	40	<=W	40	<=W	80	<T	120		120		660
	1	1	284	40	<T	60	<T	40	<=W	140		20	<=W	40	<=W	40	<=W	60	<T	100		120		620
	1	1	284	40	<T	40	<T	40	<=W	100		20	<=W	40	<=W	40	<=W	40	<T	80	<T	80	<T	460
Peninsula Harbour																								
Beatty Cove - Index Station	1	1	289	40	<T	40	<T	40	<=W	120		20	<=W	40	<=W	40	<=W	20	<=W	80	<T	80	<T	440
	1	1	289	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	120
	1	1	289	20	<=W	40	<T	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	20	<=W	60	<T	60	<T	220
Jellicoe Cove - Near wharf	1	1	276	140		300		120	<T	520		60	<T	120	<T	80	<T	180		440		460		3140
	1	1	276	120		240		120	<T	420		60	<T	160	<T	120	<T	220		460		400		3020
	1	1	276	160		300		80	<T	600		80	<T	160	<T	120	<T	160		580		520		3680
Jellicoe Cove - Near wharf	1	1	279	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	279	20	<=W	20	<=W	40	<=W	60	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	40	<T	140
	1	1	279	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
NE side of Hawkins Island (split sample)	1	1	468	40	<T	60	<T	40	<=W	120		20	<=W	40	<=W	40	<=W	20	<=W	120		80	<T	540
(split sample)	1	1	468	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	40	<T	80
	1	1	468	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	40	<T	20	<=W	80
	1	1	468	20	<=W	20	<=W	40	<=W	40	<T	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	40
SW of Peninsula	1	1	469	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
	1	1	469	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
STP - 500 m S	1	1	409	20	<=W	20	<=W	40	<=W	20	<=W	20	<=W	40	<=W	40	<=W	20	<=W	20	<=W	20	<=W	0
Lowest Effect Level (ng/g)				240		340		60		750		190		170		200				560		490		4000
Severe Effect Level (ug/g organic carbon) **																								11 000

<W no measurable response

<T measurable trace amount, interpret with caution

Table 7: Concentration (pg/g dry wt.) of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans in sediment collected from Lake Superior and the Spanish River, 1999. (n=1)

	Mouth of Spanish River	Spanish Index Station		Nipigon Bay S of mill outfall	Nipigon Bay Index Station		Blackbird Creek	Jackfish Bay Index Station		Pic River
Station No	400	39	39	459	286	286	701	288	288	453
Sample Depth (m)	2 2	9 8	7 3	2 8	14	12 2	1 8	18 4	42 7	11 9
2378 TCDF	13	320	280	2	1 4	0 9 <	3 <	2 4	34	0 7 <
12378PCDF	2 <	6 <	6 1	0 5 <	0 5 <	0 5 <	3 <	0 2 <	2 7	2 <
23478PCDF	1 <	7 <	5 8	1 <	0 7 <	0 4 <	3 <	0 4 <	2 5	1 <
123478 H6CDF	2 <	7 <	7 6	2 <	1	1 <	2 <	0 4 <	3 <	1 <
123678 H6CDF	2 <	3 <	2 4	1 <	0 8 <	0 8 <	2 <	0 5 <	1 <	1 <
234678 H6CDF	3 <	1 <	1 <	1 <	1 <	1 <	3 <	1 <	1 <	2 <
123789 H6CDF	1 <	2 <	2 <	1 <	0 7 <	0 8 <	2 <	0 4 <	1 <	0 9 <
1234678 HpCDF	2 <	10 <	11	14	5 3	4 1	2 <	1 <	5 9	1 <
1234789 HpCDF	1 <	2 <	2 <	1 6	0 4 <	0 5 <	2 <	0 1 <	0 6 <	0 9 <
O8CDF (total)	4 <	20 <	21	41	7 1	5 8	4 <	1 <	9 4	2 <
2378 TCDD	1 <	18	15	0 4 <	0 4 <	0 5 <	2 <	0 6 <	3 <	0 7 <
12378 PCDD	1 <	2 <	1 <	2 <	1 <	0 8 <	2 <	0 7 <	1 <	1 <
123478 HxCDD	1 <	2 <	1 5	2 <	0 9 <	0 7 <	2 <	0 5 <	1 <	1 <
123678 HxCDD	0 7 <	4 <	4 3	16	2 8	1 3	2 <	0 3 <	1.5	1 <
123789 HxCDD	1 <	3 <	3 <	6 5	2 3	1 <	2 <	0 4 <	2 8	2 <
1234678 HpCDD	7 <	55	68	180	31	13	2 <	2 6	19	2 <
O8CDD (total)	62	690	910	1500	230	92	5 <	13	100	4 <
T4CDF (total)	16 I5	550 I16	460 I14	8 3 I13	13 I20	1 <	3 <	3 7 I3	68 I8	0 7 <
P5CDF (total)	2 <	10 I4	35 I12	4 5 I3	5 3 I3	3 4 I2	3 <	0 7 <	16 I7	2 <
H6CDF (total)	3 <	12 I3	21 I6	12 I3	6 1 I5	1 1 I1	3 <	1 <	5 I2	2 <
H7CDF (total)	2 <	14 I2	26 I2	50 I4	11 I3	4 1 I1	2 <	1 <	11 I2	1 <
T4CDD (total)	1 <	20 I2	19 I3	2 2 I3	5 I4	0 8 <	2 <	0 6 <	5 I2	0 7 <
P5CDD (total)	1 <	2 5 I1	1 <	2 <	3 8 I2	2 2 I1	4 <	0 7 <	1 <	1 <
H6CDD (total)	1 <	19 I2	32 I5	66 I6	21 I7	7 5 I3	2 <	0 5 <	22 I5	2 <
H7CDD (total)	6 1 I1	110 I2	130 I2	310 I2	54 I2	26 I2	2 <	5 2 I2	44 I2	2 <
PCB081	0 4 <	0 53	0 9 <	5 2	0 5 <	0 5 <	0 9	0 3 <	0 8 <	0 4 <
PCB077	1 <	12	17	160	11	10	2 <	2 <	19	0 8 <
PCB123	1 7	36	21	380	5 4	5 9	0 83	2 <	19	0 6 <
PCB118	55	460	570	12000	250	120	18	28	280	7 <
PCB114	1 <	9 <	11	260	5 3	2 7	0 38	1 <	7 9	0 6 <
PCB105	22	170	210	4300	100	52	7 5	10 <	130	3 <
PCB126	0 5 <	2 4	4 1	26	2 <	1 <	0 6 <	0 5 <	3 4	0 2 <
PCB167	1 5	24	43	1000	20	6 9	1 <	3 <	20	0 3 <
PCB156	6 6	62	100	2500	42	23	1 9	6 2	56	0 5 <
PCB157	2	15	25	510	10 <	4 <	1 <	2 <	13	0 4 <
PCB169	0 1 <	0 3 <	0 6 <	1 <	0 6 <	0 8 <	0 3 <	0 1 <	1 <	0 4 <
PCB189	0 52	4 6	5 5	140	3 <	2 <	0 6 <	1 <	9 5	0 2 <
TOC mg/g	2	13	39	120	13	14	2	6	51	1
TEQ pg/g	1 3	51 0	49 2	10 5	1 2	0.3	0 0	0 3	5.9	0 0

I(no) - number of isomers detected in this congener group
< Actual result is less than reported value

Table 7: Concentration (pg/g dry wt.) of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans in sediment collected from Lake Superior and the Spanish River, 1999. (n=1)

	Kam River at Mission River	Provincial Paper	Welcome Island	Beatty Cove Index Station
Station No	802	465	284	289
Sample Depth (m)	8 2	2.4	17 1	19
2378 TCDF	1 6	22	22	11
12378PCDF	0.3 <	0 7 <	4 4	2 1
23478PCDF	0 4 <	0.6 <	4 6	1 9
123478 H6CDF	0.5 <	0 8 <	9 2	3 5
123678 H6CDF	0 7 <	1 <	10	1 <
234678 H6CDF	1 <	2 <	2 <	1 <
123789 H6CDF	0 5 <	0 7 <	5.9	0 8 <
1234678 HpCDF	6 8	8	360	5 1
1234789 HpCDF	0 5 <	0.6 <	6 4	0 98
O8CDF (total)	19	19	350	8 7
2378 TCDD	0 6 <	2 3	3 9	1 8
12378 PCDD	0 7 <	2 <	4 8	1 <
123478 HxCDD	0 6 <	2 <	3 9	1 <
123678 HxCDD	1 <	6	18	1 <
123789 HxCDD	1 <	4 6	9 1	1 5
1234678 HpCDD	30	29	260	14
O8CDD (total)	260	190	1700	84
T4CDF (total)	20 I9	38 I9	77 I17	34 I18
P5CDF (total)	2.2 I2	2.4 I1	80 I10	13 I8
H6CDF (total)	4.2 I3	6.7 I3	250 I8	11 I7
H7CDF (total)	18 I2	22 I2	770 I3	11 I3
T4CDD (total)	2 <	7 4 I4	26 I7	4 2 I3
P5CDD (total)	1 1 I1	1.3 I2	29 I8	2 I1
H6CDD (total)	6 1 I2	42 I5	130 I8	13 I6
H7CDD (total)	59 I2	55 I2	490 I2	34 I2
PCB081	2 <	2	8 4	1 <
PCB077	43	47	220	22
PCB123	12	84	100	110
PCB118	420	3000	3500	1300
PCB114	12	72	78	21
PCB105	180	1200	1400	370
PCB126	1 <	4 <	15	6 9
PCB167	11	96	150	210
PCB156	30	290	440	530
PCB157	6 <	67	100	43
PCB169	0.3 <	0 3 <	1 <	1 <
PCB189	2 <	10 <	33	140
TOC (mg/g)	22	380	28	34
TEQ (pg/g)	0.64	6.60	27.84	5.85

I(no) - number of isomers detected in this congener group

< Compound was below the detection limit

Appendix 1. Selected water quality parameters collected for the Great Lakes Nearshore Index Station Network, 1999

Survey Area	Station Number			Field#	Date	Typ	Time	Water Depth	ALUT ug/L Valqual	CLIDUR mg/L Valqual	COND25	CRUT ug/L Valqual	CUUT ug/L Valqual	FEUT ug/L Valqual	Secchi Depth (m)	HGUT ng/L	MNUT ug/L Valqual	MOUT ug/L Valqual	NIUT ug/L Valqual
Spanish River	14	1	39	GL978110	1999/05/12	12	1721	98	38.3 +/- 11.000	8.6	150	1.5 +/- 5.000	2.94 +/- 5.000	85 +/- 50.000	1.4	1.26	27.30 +/- 2.000	0.24 +/- 5.000	22.20 +/- 1.600
	14	1	39	GL978111	1999/05/12	12	1727	98	34.4 +/- 11.000	8.6	150	1.8 +/- 5.000	2.81 +/- 5.000	81 +/- 51.000	1.4	1.42	27.10 +/- 2.300	0.21 +/- 5.000	21.90 +/- 1.700
	14	1	39	GL978112	1999/05/12	12	1730	98	34.1 +/- 11.000	8.6	149	1.3 +/- 5.000	2.86 +/- 5.000	82 +/- 50.000	1.4	1.41	27.30 +/- 1.800	0.22 +/- 5.000	21.90 +/- 1.700
	14	1	39	GL978113	1999/05/12	11	1740	98	31.7 +/- 10.000	8.8	144	1.4 +/- 5.000	2.17 +/- 5.000	75 +/- 50.000		1.37	25.60 +/- 1.600	0.23 +/- 5.000	21.30 +/- 1.700
	14	1	39	GL977083	1999/08/11	12	845	99	18.0 +/-1	10.0	175	0.3 +/-0.5	1.60 +/-0.5	43 +/-5	2.3	1.68	24.80 +/-1.9	0.30 +/-0.5	8.00 +/-0.6
	14	1	39	GL977085	1999/08/11	12	954	99	21.0 +/-1	10.0	177	2.1 +/-0.5	2.00 +/-0.5	42 +/-5		1.65	23.50 +/-1.2	0.40 +/-0.5	12.10 +/-0.6
	14	1	39	GL977086	1999/08/11	11	1003	98	33.0 +/-2	11.0	182	2.1 +/-0.5	2.10 +/-0.5	61 +/-5		1.70	24.30 +/-1.3	0.30 +/-0.5	12.40 +/-1.2
	14	1	39	GL951048	1999/10/19	12	1424	98	38.0 +/-2	15.6	218	0.5 +/-0.5	2.30 +/-0.5	105 +/-8	2.0	2.24	30.70 +/-1.9	0.40 +/-0.5	14.50 +/-1.1
	14	1	39	GL951049	1999/10/19	12	1427	98	36.0 +/-2	15.6	218	0.5 +/-0.5	2.20 +/-0.5	100 +/-5		2.20	30.10 +/-1.5	0.40 +/-0.5	13.90 +/-0.7
	14	1	39	GL951050	1999/10/19	12	1431	98	36.0 +/-2	15.6	219	0.3 +/-0.5	2.00 +/-0.5	95 +/-8		2.25	29.30 +/-2.4	0.40 +/-0.5	14.00 +/-0.8
	14	1	39	GL951051	1999/10/19	11	1436	98	48.0 +/-4	17.4	235	0.5 +/-0.5	2.50 +/-0.5	128 +/-7		2.38	40.30 +/-3.6	0.40 +/-0.5	18.80 +/-1
Nipigon Bay	1	1	286	GL978168	1999/05/22	12	1151	142	62.7 +/- 11.000	1.4	127	3.6 +/- 5.000	-0.50 +/- 5.000	70 +/- 51.000	1.4	1.28	3.88 +/- 1.000	0.12 +/- 5.000	-0.18 +/- 1.000
	1	1	286	GL978169	1999/05/22	12	1154	143	60.2 +/- 11.000	1.0	125	2.8 +/- 5.000	-0.42 +/- 5.000	71 +/- 51.000		1.27	3.83 +/- 1.000	0.11 +/- 5.000	-0.09 +/- 1.000
	1	1	286	GL978170	1999/05/22	12	1158	142	62.5 +/- 11.000	1.2	125	2.8 +/- 5.000	-0.46 +/- 5.000	75 +/- 51.000		1.27	3.83 +/- 1.100	0.11 +/- 5.000	-0.07 +/- 1.000
	1	1	286	GL978171	1999/05/22	11	1202	140	66.8 +/- 11.000	1.2	126	3.0 +/- 5.000	-0.38 +/- 5.000	82 +/- 51.000		1.28	4.52 +/- 1.000	0.15 +/- 5.000	-0.05 +/- 1.000
	1	1	286	GL977045	1999/07/31	12	1020	140	74.5 +/-7.45	1.2	134	2.0 +/-0.5	1.36 +/-0.5	71 +/-9.29		1.35	2.21 +/-0.221	0.17 +/-0.5	0.33 +/-0.241
	1	1	286	GL977046	1999/07/31	12	1022	140	66.3 +/-10.5	1.2	134	1.4 +/-0.5	1.35 +/-0.5	67 +/-15.2		1.35	2.26 +/-0.407	0.17 +/-0.5	0.42 +/-0.49
	1	1	286	GL977047	1999/07/31	12	1026	139	66.2 +/-6.62	1.2	135	1.4 +/-0.5	1.50 +/-0.5	65 +/-9.77		1.45	2.27 +/-0.267	0.17 +/-0.5	0.54 +/-0.672
	1	1	286	GL977048	1999/07/31	11	1036	139	46.2 +/-4.62	1.4	110	1.9 +/-0.5	1.17 +/-0.5	53 +/-7.97		1.05	2.74 +/-0.274	0.19 +/-0.5	0.47 +/-0.435
	1	1	286	GL951010	1999/10/11	12	1407	142	66.0 +/-4	1.2	121	3.3 +/-0.5	1.30 +/-0.5	75 +/-5	1.4	1.32	4.10 +/-0.2	0.10 +/-0.5	1.00 +/-0.2
	1	1	286	GL951011	1999/10/11	12	1411	142	68.0 +/-4	1.2	122	2.5 +/-0.5	1.30 +/-0.5	76 +/-6		1.33	4.10 +/-0.2	0.10 +/-0.5	0.90 +/-0.3
	1	1	286	GL951012	1999/10/11	12	1416	141	69.0 +/-4	1.2	122	2.9 +/-0.5	1.30 +/-0.5	77 +/-5		0.15	4.10 +/-0.2	0.10 +/-0.5	1.00 +/-0.1
	1	1	286	GL951013	1999/10/11	11	1422	141	77.0 +/-4	1.4	123	2.5 +/-0.5	1.20 +/-0.5	87 +/-6		1.32	4.50 +/-0.2	0.10 +/-0.5	1.00 +/-0.2
	1	1	286	GL951014	1999/10/11	12	1423	141	0.0 +/-1			0.2 +/-0.5	0.10 +/-0.5	2 +/-5			0.00 +/-0.1	0.00 +/-0.5	0.00 +/-0.1
Jackfish Bay	1	1	288	GL978152	1999/05/20	12	1225	177	10.9 +/- 10.000	1.8	105	1.4 +/- 5.000	0.57 +/- 5.000	3 +/- 50.000	4.6	0.98	3.12 +/- 1.000	0.09 +/- 5.000	-0.06 +/- 1.000
	1	1	288	GL978153	1999/05/20	12	1257	177	25.8 +/- 10.000	1.6	103	1.7 +/- 5.000	1.19 +/- 5.000	5 +/- 50.000		0.99	3.52 +/- 1.000	0.07 +/- 5.000	0.08 +/- 1.000
	1	1	288	GL978154	1999/05/20	12	1301	178	11.2 +/- 10.000	1.8	103	2.0 +/- 5.000	0.69 +/- 5.000	2 +/- 50.000		0.95	3.27 +/- 1.100	0.08 +/- 5.000	0.02 +/- 1.000
	1	1	288	GL978155	1999/05/20	11	1252	178	12.8 +/- 10.000	1.8	106	2.5 +/- 5.000	0.17 +/- 5.000	13 +/- 50.000		1.02	4.05 +/- 1.100	0.13 +/- 5.000	-0.12 +/- 1.000
	1	1	288	GL977054	1999/08/03	12	942	173	11.1 +/-1	3.6	111	1.7 +/-0.5	0.90 +/-0.5	12 +/-5	6.0	1.12	9.32 +/-0.932	0.22 +/-0.5	0.31 +/-0.29
	1	1	288	GL977055	1999/08/03	12	946	173	10.8 +/-1.08	3.6	113	2.2 +/-0.5	0.90 +/-0.5	9 +/-5		1.13	8.30 +/-0.83	0.22 +/-0.5	0.26 +/-0.127
	1	1	288	GL977056	1999/08/03	12	952	172	10.2 +/-1.36	3.4	113	2.1 +/-0.5	0.92 +/-0.5	9 +/-5		1.10	7.21 +/-0.721	0.21 +/-0.5	0.40 +/-0.404
	1	1	288	GL977057	1999/08/03	11	1000	173	7.2 +/-1.27	1.4	98	2.3 +/-0.5	0.88 +/-0.5	8 +/-5		0.95	0.80 +/-0.1	0.20 +/-0.5	0.51 +/-0.25
	1	1	288	GL977058	1999/08/03	15	1004	173	0.3 +/-1			0.1 +/-0.5	0.58 +/-0.5	1 +/-5			0.01 +/-0.1	0.06 +/-0.5	-0.03 +/-0.1
	1	1	288	GL951019	1999/10/13	12	1334	188	11.0 +/-1	1.8	96	1.9 +/-0.5	0.90 +/-0.5	9 +/-5	6.0	1.00	1.80 +/-0.2	0.10 +/-0.5	0.70 +/-0.1
	1	1	288	GL951020	1999/10/13	12	1341	187	11.0 +/-1	1.8	97	1.6 +/-0.5	1.00 +/-0.5	9 +/-5		1.01	1.80 +/-0.1	0.10 +/-0.5	0.50 +/-0.2
	1	1	288	GL951021	1999/10/13	12	1351	183	11.0 +/-1	1.8	98	0.8 +/-0.5	0.90 +/-0.5	11 +/-6		1.01	1.80 +/-0.3	0.10 +/-0.5	0.50 +/-0.1
	1	1	288	GL951022	1999/10/13	11	1421	190	12.0 +/-1	1.8	97	1.3 +/-0.5	0.90 +/-0.5	10 +/-5		1.01	1.80 +/-0.1	0.10 +/-0.5	0.60 +/-0.2
Thunder Bay	1	1	284	GL978174	1999/05/24	12		199	21.6 +/- 11.000	1.2		1.9 +/- 5.000	-0.8 +/- 5.000	23 +/- 51.000	2.4	2.00	2.12 +/- 1.000	0.15 +/- 5.000	-0.21 +/- 1.000
	1	1	284	GL977037	1999/07/29	12		174	15.5 +/-2.96	1.8	102	2.0 +/-0.5	0.9 +/-0.5	18 +/-5.66	4.0		1.65 +/-0.165	0.21 +/-0.5	0.46 +/-0.494
	1	1	284	GL951002	1999/10/10	12		172	16.0 +/-1	1.6	84	1.8 +/-0.5	0.8 +/-0.5	15 +/-5	8.0		1.10 +/-0.1	0.00 +/-0.5	0.60 +/-0.1
Peninsula	1	1	289	GL978137	1999/05/17	12		199	7.9 +/- 10.000	1.6	96	2.4 +/- 5.000	0.6 +/- 5.000	1 +/- 50.000	5.2	1.80	0.84 +/- 1.000	0.08 +/- 5.000	0.01 +/- 1.000
	1	1	289	GL977060	1999/08/04	12		188	7.3 +/-1	1.2	97	2.9 +/-0.5	0.8 +/-0.5	6 +/-5	9.0	0.55	0.87 +/-0.1	0.23 +/-0.5	0.33 +/-0.351
	1	1	289	GL951025	1999/10/14	12		199	7.0 +/-1	1.4	84	1.3 +/-0.5	0.9 +/-0.5	7 +/-5	7.0		0.70 +/-0.1	0.10 +/-0.5	0.60 +/-0.1

12 WATER - DEPTH COMPOSITE SAMPLE
11 WATER - SURFACE GRAB SAMPLE

Appendix 1: Selected water quality parameters collected for the Great Lakes Nearshore Index Station Network, 1999

Survey Area	Station Number			Field#	Date	Typ	NNHTUR mg/L	Valqual	NNO2UR mg/L	Valqual	NNOTUR mg/L	Valqual	NNTKUR mg/L	Valqual	PBUT ug/L	Valqual	PHNOL	PPUT mg/L	Valqual	RSP mg/L	Valqual	ZNUT ug/L	Valqual
Spanish River	14	1	39	GL978110	1999/05/12	12	0.030		0.002	<T	0.230		0.320		0.089	+/- 0.500	0.2	0.012		2.5	<T	3.7	+/- 2.000
	14	1	39	GL978111	1999/05/12	12	0.018		0.003	<T	0.230		0.320		0.086	+/- 0.500		0.012		2.0	<T	3.4	+/- 2.000
	14	1	39	GL978112	1999/05/12	12	0.024		0.002	<T	0.225		0.340		0.084	+/- 0.500		0.016		2.5		3.4	+/- 2.000
	14	1	39	GL978113	1999/05/12	11	0.020		0.004	<T	0.275		0.300		0.075	+/- 0.500		0.012		1.5	<T	3.5	+/- 2.000
	14	1	39	GL977083	1999/08/11	12	0.016		0.003	<T	0.090		0.240		0.070	+/-0.05		0.008	<T	2.5	<T	1.9	+/-0.3
	14	1	39	GL977085	1999/08/11	12	0.022		0.004	<T	0.095		0.260		0.090	+/-0.05	0.4	0.008	<T	2.5	<T	1.4	+/-0.2
	14	1	39	GL977086	1999/08/11	11	0.016		0.003	<T	0.080		0.240		0.090	+/-0.05		0.008	<T	2.5		2.3	+/-0.2
	14	1	39	GL951048	1999/10/19	12	0.020		0.002	<T	0.140		0.320		0.140	+/-0.05		0.016		3.0		3.5	+/-0.3
	14	1	39	GL951048	1999/10/19	12	0.020		0.001	<=W	0.143		0.320		0.110	+/-0.05		0.020		3.0		2.4	+/-0.2
	14	1	39	GL951050	1999/10/19	12	0.018		0.001	<=W	0.144		0.380		0.100	+/-0.05	1.2	0.020		3.0		2.5	+/-0.3
	14	1	39	GL951051	1999/10/19	11	0.016		0.002	<T	0.141		0.280		0.130	+/-0.05		0.012		3.5		2.9	+/-0.2
Nipigon Bay	1	1	286	GL978168	1999/05/22	12	0.004	<T	0.002	<T	0.200		0.200		-0.057	+/- 0.500		0.008	<T	4.5		1.9	+/- 2.000
	1	1	286	GL978169	1999/05/22	12	0.006	<T	0.002	<T	0.200		0.220		-0.060	+/- 0.500		0.008	<T	4.5		2.0	+/- 2.000
	1	1	286	GL978170	1999/05/22	12	0.002	<=W	0.002	<T	0.200		0.180		-0.057	+/- 0.500		0.008	<T	4.5		1.6	+/- 2.000
	1	1	286	GL978171	1999/05/22	11	0.002	<=W	0.002	<T	0.185		0.160		-0.046	+/- 0.500		0.008	<T	5.5		1.8	+/- 2.000
	1	1	286	GL977045	1999/07/31	12	0.002	<=W	0.003	<T	0.125		0.200		0.061	+/-0.05		0.004	<T	2.5		1.0	+/-0.401
	1	1	286	GL977046	1999/07/31	12	0.002	<=W	0.004	<T	0.125		0.220		0.035	+/-0.05		0.008	<T	3.0		0.9	+/-0.187
	1	1	286	GL977047	1999/07/31	12	0.002	<=W	0.003	<T	0.120		0.200		0.073	+/-0.05	0.2	0.006	<T	3.0		3.6	+/-0.355
	1	1	286	GL977048	1999/07/31	11	0.006	<T	0.002	<T	0.300		0.120		0.043	+/-0.05		0.004	<T	3.0		1.5	+/-0.995
	1	1	286	GL951010	1999/10/11	12	0.004	<T	0.002	<T	0.167		0.180		0.030	+/-0.05		0.008	<T	5.0		2.1	+/-0.3
	1	1	286	GL951011	1999/10/11	12	0.006	<T	0.002	<T	0.168		0.200		0.010	+/-0.07		0.008	<T	5.0		1.5	+/-0.2
	1	1	286	GL951012	1999/10/11	12	0.008	<T	0.002	<T	0.166		0.160		0.030	+/-0.07	0.4	0.006	<T	4.5		1.8	+/-0.4
	1	1	286	GL951013	1999/10/11	11	0.008	<T	0.003	<T	0.176		0.200		0.040	+/-0.07		0.008	<T	5.0		1.6	+/-0.2
	1	1	286	GL951014	1999/10/11	12									-0.010	+/-0.07						1.4	+/-0.2
Jackfish Bay	1	1	288	GL978152	1999/05/20	12	0.004	<T	0.003	<T	0.350		0.120		0.013	+/- 0.500		0.004	<T	1.0	<T	0.5	+/- 2.000
	1	1	288	GL978153	1999/05/20	12	0.004	<T	0.003	<T	0.350		0.160		0.444	+/- 0.500		0.004	<T	0.5	<W	16.7	+/- 2.500
	1	1	288	GL978154	1999/05/20	12	0.002	<=W	0.003	<T	0.350		0.120		0.013	+/- 0.500		0.004	<T	1.0	<T	1.1	+/- 2.000
	1	1	288	GL978155	1999/05/20	11	0.004	<T	0.002	<T	0.355		0.160		0.001	+/- 0.500		0.004	<T	1.0	<T	1.1	+/- 2.000
	1	1	288	GL977054	1999/08/03	12	0.018		0.006		0.315		0.160		0.025	+/-0.05		0.006	<T	1.0	<T	1.8	+/-0.486
	1	1	288	GL977055	1999/08/03	12	0.016		0.006		0.315		0.180		0.029	+/-0.05		0.008	<T	1.0	<T	2.0	+/-0.235
	1	1	288	GL977056	1999/08/03	12	0.022		0.006		0.315		0.160		0.028	+/-0.05	0.2	0.008	<T	1.5	<T	1.4	+/-0.392
	1	1	288	GL977057	1999/08/03	11	0.008	<T	0.002	<T	0.330		0.080	<T	0.011	+/-0.05		0.004	<T	1.0	<T	1.3	+/-0.544
	1	1	288	GL977058	1999/08/03	15									-0.004	+/-0.05						1.1	+/-0.208
	1	1	288	GL951019	1999/10/13	12	0.012		0.004	<T	0.337		0.140		0.020	+/-0.06		0.008	<T	0.5	<W	1.7	+/-0.4
	1	1	288	GL951020	1999/10/13	12	0.012		0.004	<T	0.339		0.120		-0.010	+/-0.05		0.004	<T	1.0	<T	1.8	+/-0.5
	1	1	288	GL951021	1999/10/13	12	0.012		0.004	<T	0.339		0.120		0.020	+/-0.05	0.2	0.004	<T	1.0	<T	2.1	+/-0.2
	1	1	288	GL951022	1999/10/13	11	0.012		0.004	<T	0.337		0.120		0.010	+/-0.05		0.004	<T	0.5	<T	2.4	+/-0.2
Thunder Bay	1	1	284	GL978174	1999/05/24	12	0.002	<=W	0.001	<T	0.34		0.120		-0.07	+/- 0.500		0.004	<T	2.0	<T	1.606	+/- 2.000
	1	1	284	GL977037	1999/07/29	12	0.002	<=W	0.002	<T	0.290		0.160		0.05	+/-0.05		0.008	<T	2.5	<T	1.08	+/-0.291
	1	1	284	GL951002	1999/10/10	12	0.006	<T	0.002	<T	0.341		0.120		0.07	+/-0.06		0.004	<T	1.0	<T	2.0	+/-0.2
Peninsula	1	1	289	GL978137	1999/05/17	12	0.002	<=W	0.001	<=W	0.350		0.080	<T	0.00	+/- 0.500		0.004	<T	0.5	<T	0.5	+/- 2.000
	1	1	289	GL977060	1999/08/04	12	0.020		0.012		0.355		0.120		0.02	+/-0.505		0.004	<T	1.0	<T	1.7	+/-0.395
	1	1	289	GL951025	1999/10/14	12	0.012		0.004	<T	0.328		0.080	<T	-0.02	+/-0.05		0.002	<=W	0.5	<W	1.6	+/-0.4

12 WATER - DEPTH COMPOSITE SAMPLE
11 WATER - SURFACE GRAB SAMPLE

Appendix 2: Water quality data for field and travel blanks collected for the Lake Superior Harbour Water Quality Monitoring Survey, 1999

Survey Area		Field#	Date	ALUT Valqual u g/L	ASUT Valqual u g/L	BAUT Valqual u g/L	BEUT Valqual u g/L	CDUT Valqual u g/L	CLIDUR Valqual mg/L	COUT Valqual u g/L	CRUT Valqual u g/L
Spanish River	F	GL978424	1999/05/21	-0.90 +/- 10.000	0.0005 <=W	-0.013 +/- 0.500	-0.004 +/- 1.000	-0.139 +/- 0.500	0.2 <=W	0.003 +/- 1.000	0.11 +/- 5.000
	F	GL979862	1999/05/12	0.25 +/- 10.000	0.0005 <=W	0.298 +/- 0.500	0.006 +/- 1.000	0.002 +/- 0.510	0.2 <=W	0.032 +/- 1.000	0.03 +/- 5.000
	T	GL979863	1999/05/06	0.11 +/- 10.000	0.0005 <=W	0.018 +/- 0.500	0.011 +/- 1.000	-0.019 +/- 0.510	0.2 <=W	0.023 +/- 1.000	-0.01 +/- 5.000
	F	GL977457	1999/08/11	1.00 +/-1	0.0005 <=W	0.080 +/-0.05	-0.100 +/-0.1	0.000 +/-0.05	0.2 <=W	0.000 +/-0.1	0.20 +/-0.5
	T	GL977458	1999/08/11	0.00 +/-1	0.0005 <=W	0.010 +/-0.05	0.000 +/-0.1	0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	0.00 +/-0.5
	F	GL954054	1999/10/20	1.00 +/-1	0.0005 <=W	0.030 +/-0.05	-0.200 +/-0.5	0.000 +/-0.05	0.2 <=W	0.000 +/-0.1	0.20 +/-0.5
	T	GL954055	1999/10/20	0.00 +/-1	0.0005 <=W	0.000 +/-0.05	-0.100 +/-0.4	0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	0.10 +/-0.5
	H	GL954056	1999/10/20								
Nipigon Bay	F	GL978432	1999/05/22	0.87 +/-1	0.0005 <=W	0.035 +/-0.05	-0.013 +/-0.1	0.000 +/-0.05	0.2 <=W	0.013 +/-0.1	-0.02 +/-0.5
	T	GL978433	1999/05/22	0.03 +/-1	0.0005 <=W	-0.006 +/-0.05	0.005 +/-0.1	-0.004 +/-0.05	0.2 <=W	0.021 +/-0.1	0.01 +/-0.5
	F	GL977421	1999/08/01	0.00 +/-1	0.0005 <=W	0.060 +/-0.05	0.000 +/-0.1	0.000 +/-0.05	0.2 <=W	0.000 +/-0.1	0.00 +/-0.5
	T	GL977422	1999/08/01	0.00 +/-1	0.0005 <=W	0.010 +/-0.05	0.000 +/-0.1	0.000 +/-0.05	0.2 <=W	0.000 +/-0.1	0.00 +/-0.5
	H	GL977423	1999/08/01								
	F	GL954021	1999/10/11	1.00 +/-1	0.0005 <=W	0.040 +/-0.05	0.000 +/-0.1	0.000 +/-0.05	0.2 <=W	0.000 +/-0.1	0.30 +/-0.5
	T	GL954022	1999/10/11	0.00 +/-1	0.0005 <=W	0.000 +/-0.05	0.000 +/-0.1	-0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	0.50 +/-0.5
	H	GL954023	1999/10/11								
Jackfish Bay	F	GL978407	1999/05/17	0.52 +/- 10.000	0.0005 <=W	0.075 +/- 0.500	0.024 +/- 1.000	-0.061 +/- 0.500	0.2 <=W	0.025 +/- 1.000	0.08 +/- 5.000
	T	GL978408	1999/05/18	-0.11 +/- 10.000	0.0005 <=W	0.002 +/- 0.500	-0.008 +/- 1.000	-0.057 +/- 0.500	0.2 <=W	0.022 +/- 1.000	0.07 +/- 5.000
	F	GL977430	1999/08/02	1.00 +/-1	0.0005 <=W	0.160 +/-0.05	0.000 +/-0.1	0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	0.00 +/-0.5
	T	GL977431	1999/08/02	0.15 +/-1	0.0005 <=W	0.014 +/-0.05	-0.015 +/-0.1	0.019 +/-0.05	0.2 <=W	0.013 +/-0.1	0.09 +/-0.5
	H	GL977432	1999/08/02								
	F	GL954030	1999/10/13	0.00 +/-1	0.0005 <=W	0.030 +/-0.05	0.000 +/-0.1	-0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	-0.10 +/-0.5
	T	GL954031	1999/10/13	0.00 +/-1	0.0005 <=W	0.000 +/-0.05	0.000 +/-0.1	0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	0.00 +/-0.5
	H	GL954032	1999/10/13								
Pic River	F	GL978415	1999/05/19	2.02 +/- 12.000	0.0005 <=W	0.067 +/- 0.500	0.022 +/- 1.000	-0.101 +/- 0.500	0.2 <=W	0.013 +/- 1.000	0.21 +/- 5.000
	T	GL978416	1999/05/19	0.14 +/- 10.000	0.0005 <=W	0.017 +/- 0.500	0.031 +/- 1.000	-0.084 +/- 0.500	0.2 <=W	0.007 +/- 1.000	0.20 +/- 5.000
	T	GL977448	1999/08/05	0.22 +/-1	0.0005 <=W	0.013 +/-0.05	0.005 +/-0.1	0.018 +/-0.05	0.2 <=W	0.016 +/-0.1	0.02 +/-0.5
	H	GL977449	1999/08/05								
Peninsula	F	GL977440	1999/08/04	0.76 +/-1	0.0005 <=W	0.091 +/-0.05	-0.005 +/-0.1	0.049 +/-0.05	0.2 <=W	0.010 +/-0.1	0.29 +/-0.5
	T	GL977441	1999/08/04	0.14 +/-1	0.0005 <=W	0.009 +/-0.05	-0.023 +/-0.1	0.020 +/-0.05	0.2 <=W	0.009 +/-0.1	0.17 +/-0.5
	H	GL977442	1999/08/04								
	F	GL954045	1999/10/15	6.00 +/-1	0.0005 <=W	0.010 +/-0.05	0.200 +/-0.4	-0.010 +/-0.06	0.2 <=W	0.000 +/-0.1	0.10 +/-0.5
	H	GL954046	1999/10/15								
Thunder Bay	F	GL978446	1999/05/26	0.66 +/- 10.000	0.0005 <=W	0.088 +/- 0.500	-0.002 +/- 1.000	0.000 +/- 0.500	0.2 <=W	0.026 +/- 1.000	0.00 +/- 5.000
	T	GL978447	1999/05/26	1.14 +/- 10.000	0.0005 <=W	0.055 +/- 0.500	0.011 +/- 1.000	0.004 +/- 0.500	0.2 <=W	0.043 +/- 1.000	-0.02 +/- 5.000
	H	GL978449	1999/05/26								
	F	GL977412	1999/07/29	-0.71 +/-2.83	0.0005 <=W	0.037 +/-0.05	-0.009 +/-0.1	0.019 +/-0.05	0.2 <=W	0.011 +/-0.1	0.06 +/-0.5
	T	GL977413	1999/07/29	-1.52 +/-2.83	0.0005 <=W	0.013 +/-0.05	-0.014 +/-0.1	0.023 +/-0.05	0.2 <=W	0.018 +/-0.1	0.12 +/-0.5
	H	GL977414	1999/07/29								
	F	GL954012	1999/10/10	0.00 +/-1	0.0005 <=W	0.030 +/-0.05	0.000 +/-0.1	-0.010 +/-0.05	0.2 <=W	0.000 +/-0.1	0.20 +/-0.5
	T	GL954013	1999/10/10	0.00 +/-1	0.0005 <=W	0.000 +/-0.05	0.000 +/-0.1	0.000 +/-0.06	0.2 <=W	0.000 +/-0.1	0.00 +/-0.5
	H	GL954014	1999/10/10								

F-blank field blank
T-blank travel blank
H-Handling blank (Hg only)
Blank data for all organic compounds (PAHs organocholinated compounds chlorinated benzenes etc.) were less than the method dection limit

Appendix 2: Water quality data for field and travel blanks collected for the Lake Superior Harbour Water Quality Monitoring Survey, 1999

Survey Area		Field#	Date	CUUT Valqual u g/L	FEUT Valqual u g/L	HGUT Valqual ng/L	MNUT Valqual u g/L	MOUT Valqual u g/L	NIUT Valqual u g/L	NNHTUR Valqual mg/L	NNO2UR Valqual mg/L
Spanish River	F	GL978424	1999/05/21	-1.64 +/- 5.000	-4.19 +/- 51.000	13.80	0.00 +/- 1.000	0.018 +/- 5.000	-0.354 +/- 1.000	0.002 <=W	0.001 <=W
	F	GL979862	1999/05/12	0.26 +/- 5.000	-5.53 +/- 50.000	7.30	0.27 +/- 1.000	0.018 +/- 5.000	0.040 +/- 1.000	0.002 <=W	0.001 <=W
	T	GL979863	1999/05/06	-0.05 +/- 5.000	-6.20 +/- 50.000	3.30	0.00 +/- 1.000	0.007 +/- 5.000	-0.022 +/- 1.000	0.002 <=W	0.001 <=W
	F	GL977457	1999/08/11	-0.20 +/-0.5	2.00 +/-5		0.10 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.004 <T	0.001 <=W
	T	GL977458	1999/08/11	-0.30 +/-0.5	4.00 +/-5	0.55	0.10 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.006 <T	0.001 <=W
	F	GL954054	1999/10/20	0.20 +/-0.5	1.00 +/-5		0.10 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.002 <=W	0.001 <=W
	T	GL954055	1999/10/20	0.00 +/-0.5	0.00 +/-5	2.10	0.00 +/-0.1	0.200 +/-0.5	0.000 +/-0.1	0.002 <=W	0.001 <=W
	H	GL954056	1999/10/20			0.20 <T					
Nipigon Bay	F	GL978432	1999/05/22	-0.08 +/-0.5	2.32 +/-5	6.75	0.17 +/-0.1	-0.035 +/-0.5	0.085 +/-0.1	0.002 <=W	0.001 <=W
	T	GL978433	1999/05/22	-0.19 +/-0.5	0.60 +/-5	5.00	0.01 +/-0.1	-0.026 +/-0.5	-0.018 +/-0.1	0.002 <=W	0.001 <=W
	F	GL977421	1999/08/01	0.10 +/-0.5	-1.00 +/-5		0.40 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.002 <=W	0.001 <=W
	T	GL977422	1999/08/01	0.10 +/-0.5	-1.00 +/-5	1.60	0.00 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.002 <=W	0.001 <=W
	H	GL977423	1999/08/01			0.25					
	F	GL954021	1999/10/11	0.30 +/-0.5	0.00 +/-5		0.10 +/-0.1	0.000 +/-0.5	0.100 +/-0.1	0.006 <T	0.001 <=W
	T	GL954022	1999/10/11	0.10 +/-0.5	2.00 +/-5	1.50	0.00 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.004 <T	0.001 <=W
	H	GL954023	1999/10/11			0.50					
Jackfish Bay	F	GL978407	1999/05/17	-0.31 +/- 5.000	-7.27 +/- 50.000	2.90	0.10 +/- 1.000	-0.015 +/- 5.000	-0.057 +/- 1.000	0.002 <=W	0.001 <=W
	T	GL978408	1999/05/18	-0.40 +/- 5.000	-7.61 +/- 50.000	4.15	-0.03 +/- 1.000	-0.012 +/- 5.000	-0.065 +/- 1.000	0.002 <=W	0.001 <=W
	F	GL977430	1999/08/02	0.50 +/-0.5	-3.00 +/-5		0.90 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.002 <=W	0.002 <T
	T	GL977431	1999/08/02	0.06 +/-0.5	1.15 +/-5	0.60	0.01 +/-0.1	0.117 +/-0.5	0.005 +/-0.1	0.002 <=W	0.001 <=W
	H	GL977432	1999/08/02			4.35					
	F	GL954030	1999/10/13	-0.30 +/-0.5	1.00 +/-5		-0.20 +/-0.2	0.000 +/-0.5	-0.600 +/-0.6	0.004 <T	0.001 <=W
	T	GL954031	1999/10/13	-0.30 +/-0.5	2.00 +/-5	0.05 <=W	-0.30 +/-0.3	0.000 +/-0.5	-0.600 +/-0.6	0.004 <T	0.001 <=W
	H	GL954032	1999/10/13			1.25					
Pic River	F	GL978415	1999/05/19	-0.74 +/- 5.000	3.24 +/- 50.000	7.75	0.04 +/- 1.000	0.013 +/- 5.000	-0.133 +/- 1.000	0.002 <=W	0.001 <=W
	T	GL978416	1999/05/19	-0.84 +/- 5.000	2.16 +/- 50.000	2.50	0.02 +/- 1.000	0.013 +/- 5.000	-0.130 +/- 1.000	0.002 <=W	0.001 <=W
	T	GL977448	1999/08/05	0.04 +/-0.5	2.63 +/-5	1.60	0.04 +/-0.1	0.101 +/-0.5	-0.014 +/-0.1	0.002 <=W	0.001 <=W
	H	GL977449	1999/08/05			0.85					
Peninsula	F	GL977440	1999/08/04	0.20 +/-0.5	1.98 +/-5		0.14 +/-0.1	0.093 +/-0.5	0.029 +/-0.1	0.002 <=W	0.001 <=W
	T	GL977441	1999/08/04	-0.03 +/-0.5	1.00 +/-5	0.20 <T	0.00 +/-0.1	0.067 +/-0.5	-0.016 +/-0.1	0.002 <=W	0.001 <=W
	H	GL977442	1999/08/04			0.15 <T					
	F	GL954045	1999/10/15	0.10 +/-0.5	3.00 +/-7		0.00 +/-0.1	0.000 +/-0.5	0.000 +/-0.1	0.004 <T	0.001 <=W
	H	GL954046	1999/10/15			0.05 <=W					
Thunder Bay	F	GL978446	1999/05/26	0.16 +/- 5.000	0.41 +/- 50.000	9.05	0.12 +/- 1.000	0.016 +/- 5.000	0.041 +/- 1.000	0.004 <T	0.001 <=W
	T	GL978447	1999/05/26	0.18 +/- 5.000	0.17 +/- 50.000	3.25	0.07 +/- 1.000	0.000 +/- 5.000	0.000 +/- 1.000	0.002 <=W	0.001 <=W
	H	GL978449	1999/05/26			0.90					
	F	GL977412	1999/07/29	0.45 +/-0.5	0.43 +/-5		0.04 +/-0.1	0.091 +/-0.5	0.014 +/-0.1	0.002 <=W	0.001 <=W
	T	GL977413	1999/07/29	0.04 +/-0.5	-0.25 +/-5	0.20 <T	-0.01 +/-0.1	0.074 +/-0.5	0.010 +/-0.1	0.002 <=W	0.001 <=W
	H	GL977414	1999/07/29			1.15				0.002 <=W	0.002 <T
	F	GL954012	1999/10/10	0.10 +/-0.5	2.00 +/-5		0.10 +/-0.1	-0.100 +/-0.5	0.100 +/-0.1	0.004 <T	0.001 <=W
	T	GL954013	1999/10/10	0.00 +/-0.5	0.00 +/-5	0.40	0.00 +/-0.1	-0.100 +/-0.5	0.000 +/-0.1	0.004 <T	0.001 <=W
	H	GL954014	1999/10/10			0.15 <T					

F-blank field blank
T-blank travel blank
H-Handling blank (Hg only)
Blank data for all organic compounds (PAHs organoch

Appendix 2 Water quality data for field and travel blanks collected for the Lake Superior Harbour Water Quality Monitoring Survey, 1999

Survey Area		Field#	Date	NNOTUR Valqual mg/L	NNTKUR Valqual mg/L	PBUT Valqual ug/L	PPUT Valqual mg/L	RSP Valqual mg/L	SRUT Valqual ug/L	TIUT Valqual ug/L	VVUT Valqual ug/L	ZNUT Valqual ug/L
Spanish River	F	GL978424	1999/05/21	0.015 <T	0.02 <=W	0.13 +/- 0.500	0.002 <=W	0.5 <W	0.40 +/- 1.000	0.27 +/- 2.000	0.01 +/- 1.000	0.32 +/- 2.000
	F	GL978862	1999/05/12	0.005 <=W	0.08 <T	0.00 +/- 0.500	0.008 <T	0.5 <T	0.06 +/- 1.000	0.22 +/- 2.000	0.01 +/- 1.000	1.82 +/- 2.000
	T	GL978863	1999/05/06	0.005 <=W	0.02 <=W	0.01 +/- 0.500	0.002 <=W	0.5 <W	0.05 +/- 1.000	0.08 +/- 2.000	0.00 +/- 1.000	0.78 +/- 2.000
	F	GL077457	1999/08/11	0.005 <=W	0.02 <=W	0.02 +/-0.05	0.002 <=W	0.5 <W	0.10 +/-0.2	0.10 +/-0.2	0.01 +/-0.05	0.60 +/-0.3
	T	GL077458	1999/08/11	0.005 <=W	0.02 <=W	0.01 +/-0.05	0.002 <=W	0.5 <W	0.00 +/-0.2	0.00 +/-0.2	-0.01 +/-0.05	0.00 +/-0.2
	F	GL954054	1999/10/20	0.030	0.04 <T	0.03 +/-0.05	0.002 <=W	0.5 <W	0.10 +/-0.2	0.10 +/-0.2	0.04 +/-0.05	1.80 +/-0.2
	T	GL954055	1999/10/20	0.020	0.04 <T	0.01 +/-0.05	0.004 <T	0.5 <W	0.10 +/-0.2	-0.20 +/-0.2	0.01 +/-0.05	0.50 +/-0.3
	H	GL954056	1999/10/20									
Nipigon Bay	F	GL978432	1999/05/22	0.010 <T	0.24	0.01 +/-0.05	0.010	0.5 <W	0.32 +/-0.26	0.09 +/-0.267	0.02 +/-0.05	0.66 +/-0.2
	T	GL978433	1999/05/22	0.005 <=W	0.02 <=W	0.01 +/-0.05	0.002 <=W	0.5 <W	0.05 +/-0.171	0.02 +/-0.2	0.00 +/-0.05	0.13 +/-0.209
	F	GL077421	1999/08/01	0.005 <=W	0.02 <=W	0.02 +/-0.05	0.002 <=W	0.5 <W	0.10 +/-0.1	0.20 +/-0.2	0.04 +/-0.05	1.60 +/-0.4
	T	GL077422	1999/08/01	0.005 <=W	0.02 <=W	1.08 +/-0.12	0.002 <=W	0.5 <W	0.00 +/-0.1	0.00 +/-0.2	0.01 +/-0.05	1.70 +/-0.3
	H	GL077423	1999/08/01									
	F	GL954021	1999/10/11	0.018 <T	0.02 <=W	0.02 +/-0.05	0.008 <T	0.5 <W	0.20 +/-0.3	0.00 +/-0.3	0.02 +/-0.05	2.40 +/-0.2
	T	GL954022	1999/10/11	0.014 <T	0.02 <=W	-0.02 +/-0.06	0.002 <=W	0.5 <W	0.00 +/-0.3	0.00 +/-0.4	0.02 +/-0.05	0.20 +/-0.2
	H	GL954023	1999/10/11									
Jackfish Bay	F	GL978407	1999/05/17	0.010 <T	0.02 <=W	0.01 +/- 0.500	0.002 <=W	0.5 <W	2.12 +/- 1.100	0.17 +/- 2.000	0.01 +/- 1.000	2.18 +/- 2.000
	T	GL978408	1999/05/18	0.010 <T	0.02 <=W	-0.04 +/- 0.500	0.002 <=W	0.5 <W	-0.08 +/- 1.000	0.09 +/- 2.000	0.00 +/- 1.000	-0.09 +/- 2.000
	F	GL977430	1999/08/02	0.020 <T	0.02 <=W	0.02 +/-0.05	0.002 <=W	0.5 <W	0.10 +/-0.1	0.10 +/-0.2	0.06 +/-0.05	2.50 +/-0.8
	T	GL977431	1999/08/02	0.020 <T	0.02 <=W	0.01 +/-0.05	0.002 <=W	0.5 <W	0.04 +/-0.132	0.03 +/-0.146	-0.05 +/-0.1	0.94 +/-0.149
	H	GL977432	1999/08/02									
	F	GL954030	1999/10/13	0.046	0.02 <=W	0.02 +/-0.05	0.002 <=W	0.5 <W	-0.10 +/-0.3	0.00 +/-0.2	0.02 +/-0.05	0.80 +/-0.2
	T	GL954031	1999/10/13	0.013 <T	0.02 <=W	0.00 +/-0.05	0.002 <=W	0.5 <W	-0.10 +/-0.3	0.00 +/-0.2	0.01 +/-0.05	-0.10 +/-0.3
	H	GL954032	1999/10/13									
Pic River	F	GL978415	1999/05/19	0.020 <T	0.02 <=W	0.04 +/- 0.500	0.002 <=W	0.5 <W	0.40 +/- 1.000	0.02 +/- 2.000	0.02 +/- 1.000	0.21 +/- 2.000
	T	GL978416	1999/05/19	0.010 <T	0.02 <=W	0.04 +/- 0.500	0.002 <=W	0.5 <W	0.12 +/- 1.000	0.00 +/- 2.000	0.01 +/- 1.000	1.04 +/- 2.000
	T	GL077448	1999/08/05	0.005 <=W	0.02 <=W	0.01 +/-0.505	0.002 <=W	0.5 <W	-0.07 +/-0.202	0.17 +/-0.327	-0.03 +/-0.1	1.75 +/-0.307
	H	GL077449	1999/08/05									
Peninsula	F	GL977440	1999/08/04	0.005 <=W	0.04 <T	0.03 +/-0.05	0.004 <T	0.5 <W	0.17 +/-0.139	0.08 +/-0.145	0.04 +/-0.1	2.25 +/-0.585
	T	GL077441	1999/08/04	0.005 <=W	0.02 <=W	0.01 +/-0.05	0.004 <T	0.5 <W	-0.07 +/-0.143	0.04 +/-0.193	0.04 +/-0.1	0.58 +/-0.296
	H	GL077442	1999/08/04									
	F	GL954045	1999/10/15	0.031	0.02 <=W	0.00 +/-0.05	0.006 <T	0.5 <W	0.00 +/-0.2	-0.10 +/-0.3	0.00 +/-0.05	1.00 +/-0.4
	H	GL954040	1999/10/15									
Thunder Bay	F	GL078448	1999/05/26	0.020 <T	0.02 <=W	0.01 +/- 0.500	0.002 <=W	0.5 <T	0.27 +/- 1.000	0.02 +/- 2.000	-0.02 +/- 1.000	2.07 +/- 2.100
	T	GL078447	1999/05/26	0.010 <T	0.02 <=W	0.14 +/- 0.510	0.002 <=W	0.5 <W	0.01 +/- 1.000	-0.08 +/- 2.000	0.04 +/- 1.000	1.16 +/- 2.000
	H	GL078449	1999/05/26									
	F	GL077412	1999/07/29	0.005 <=W	0.02 <=W	0.06 +/-0.05	0.002 <=W	0.5 <W	0.13 +/-0.12	0.32 +/-0.836	0.04 +/-0.1	1.27 +/-0.162
	T	GL977413	1999/07/29	0.005 <=W	0.02 <=W	0.01 +/-0.05	0.002 <=W	0.5 <W	0.01 +/-0.13	0.14 +/-0.2	0.04 +/-0.1	0.02 +/-0.589
	H	GL077414	1999/07/29	0.005 <=W								
	F	GL954012	1999/10/10	0.022 <T	0.02 <=W	0.02 +/-0.05	0.002 <=W	0.5 <W	0.10 +/-0.2	0.00 +/-0.2	0.01 +/-0.05	1.00 +/-0.2
	T	GL954013	1999/10/10	0.015 <T	0.02 <=W	0.00 +/-0.00	0.002 <=W	0.5 <W	0.00 +/-0.2	-0.10 +/-0.2	0.03 +/-0.05	1.40 +/-0.2
	H	GL054014	1999/10/10									

F-blank field blank
T-blank travel blank
H-Handling blank (Hg only)
Blank data for all organic compounds (PAHs, organochl